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AN ESSAY

ON THE

FARMING

OF

NORTHAMPTONSHIRE

BY JOHN L. BAKER, C.E.,

SURVEYOR AND ESTATE AGENT.

LONDON:
PRINTED BY J. B. NICHOLS AND SON,
25, PARLIAMENT STREET.

1852.

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BY JOHN L. BAKER, C.E.,

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"Vestigia nulla retrorsum."

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1852.

[*Price One Shilling and Sixpence.*]

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TO

PHILIP PUSEY, ESQ., M.P., F.R.S.,

ETC., ETC.,

CHAIRMAN OF THE JOURNAL COMMITTEE OF THE ROYAL AGRICULTURAL SOCIETY,

THIS ESSAY IS BY KIND PERMISSION

DEDICATED,

WITH THE ESTEEM AND RESPECT

OF

THE AUTHOR.

PREFACE.

THE following pages—the result of a little leisure and a three weeks' tour through the county at the beginning of 1851, made more for his own information than any other object—the Author would not have presumed to publish on his own responsibility.

His Essay, however, having come under the notice of Mr. Pusey, was honoured by an expression, not only of his warm approval, and of regret that it should not be printed, but also of the greatest readiness to give the sanction of his name to its publication.

The Author, therefore, has no hesitation in availing himself of such a sanction to a step that he would not otherwise have thought of taking.

If the following pages may tend, in any degree, to inform and stimulate his brother farmers, and advance agriculture in his native county, he will feel more than repaid; and they will have answered a purpose little contemplated for them.

The Author is also glad of this opportunity of offering his best thanks to very many whose courtesy he experienced, whose hospitality he enjoyed, and by whose information he profited, on his tour through the county—a trip which was rendered, by their kindness, as pleasurable as it was instructive.

Hargrave, *May*, 1852.

CONTENTS.

I.—The *nature* and capabilities of the County 1

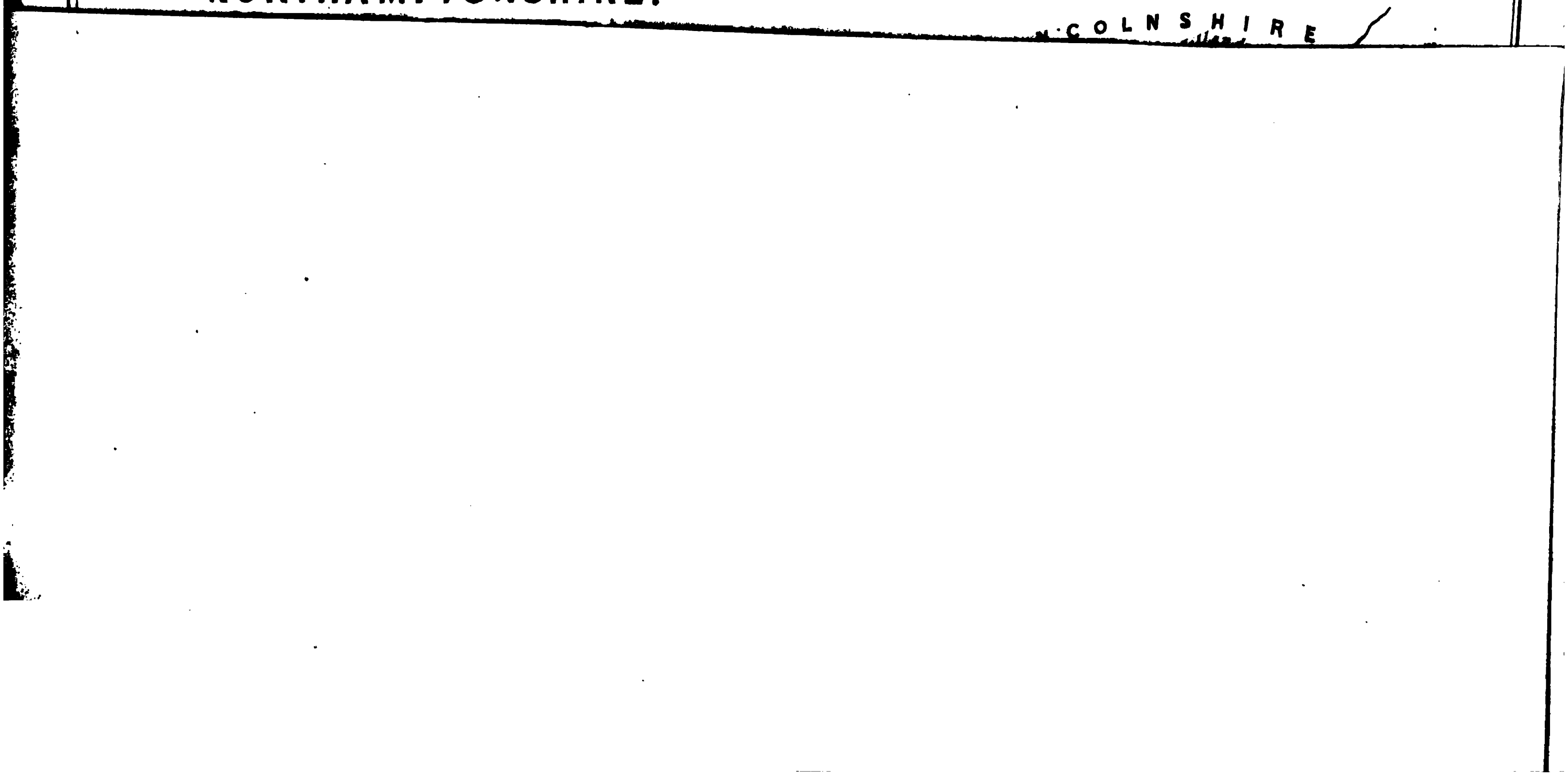
II.—The *actual state* in which we find it ; firstly, as regards the *management of the land* on the different soils which it comprises ; and, secondly, as regards *all other matters* connected with Farming, viz :—Buildings, Draining, &c. &c. 9

III.—Improvements, past and prospective 40

GEOLOGICAL MAP

OF

NORTHAMPTONSHIRE.



ON THE

FARMING OF NORTHAMPTONSHIRE.

I. Physical Character of the County.

Geographical position.

NORTHAMPTONSHIRE is an inland county, bounded on the north by the counties of Leicester, Rutland, and Lincoln; on the east by Cambridge and Huntingdon; on the south by Bedford and Buckingham; and on the west by the counties of Oxford and Warwick.

Extent.

The county is 67 miles in length and 23 in breadth at the widest part, and contains 628,480 statute acres.* It is calculated to be about equally divided between tillage and pasture, exclusive of roads, rivers, and woodlands, which latter are rather extensive, and include the last remaining fragments of the forests of Rockingham, Whittlebury, and Salcey. It is noted far and wide as a grazing county, the best pastures being most extensive and richest on the north-west, next the borders of Leicestershire and Warwickshire.

External features.

The eastern extremity or point of the county dips into the Great Fen district, to the extent, however, of but a few thousand acres, lying beyond Peterborough.

The surface of the county presents a pleasing aspect of gentle hill and dale, with a succession of rounded eminences, combined with a general rising tendency towards the west, terminating with the high conical summit of Arbury Hill, near Daventry, at one point, and the high table-land of Naseby at another, about half a mile from the battle-field of which celebrated

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* This quantity may appear somewhat at variance with the contents given in any works hitherto published, but I have obtained it by an accurate computation of the Ordnance Map, which is the best authority we have.

FARMING OF NORTHAMPTONSHIRE.

1. [illegible]

NORTHAMPTONSHIRE [illegible] north by the counties of [illegible] the east by Cambridge [illegible] Bedford and Buckingham [illegible] Oxford and Warwick.

The county [illegible] widest part [illegible] to be about [illegible] are 45 miles [illegible] extensive [illegible] forests of [illegible] fir and [illegible] extensive [illegible] Rockingham [illegible]

The [illegible] Great [illegible] and [illegible]

The surface [illegible] hill and dale [illegible] with a general [illegible] with the high [illegible] at one point [illegible] about half [illegible]

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* This [illegible]

place three of the eight rivers whose source is in this county take their rise, namely, the Nene, the Avon, and the Ise.

Quarries. The celebrated stone called "Barnack Rag," was formerly obtained from quarries at the place from which it takes its name, the durability of which many of our churches and cathedrals can bear testimony to. There are also several excellent freestone quarries in the county, and at Easton and Collyweston a coarse description of grey slate is obtained, with which many of the colleges at Cambridge are roofed.

Inhabitants. To use an old trite saying, the county is famous for "spires, springs, and squires," and it certainly abounds with resident landed proprietors, from the duke to the yeoman, doubtless attracted here in more variable and troublous times, no less by the snug seclusion and security of an inland retreat than by the fertility of the soil, and still more, perhaps, by the presence of extensive forests well stocked with wild animals and game, wondrous tempting to the hunting propensities of the true Englishman.

The yeomen farming their own estates are quite a feature of this county, of which they form a large and important body, some parishes being almost entirely owned and occupied by them; but, generally speaking, they are more remarkable for their partiality for country sports than for the strides they make in agricultural improvement, and the ardour with which they may be seen following the primitive pastime of the chase is quite worthy of their ancestors.

General character and capabilities. In its agricultural capacity, Northamptonshire possesses eminent natural advantages, for, although there is a considerable variety both in the soils and subsoils, full one half the county may be termed first-class land, and the remainder, by thorough draining and vigorous farming, is capable of being brought to a high state of cultivation, and producing excellent crops. Some of the varieties of land are not apparent so much from any excess or falling-off of the produce, as from the different purposes to which the farmer, finding them suited, has applied them, and when (as is often the case) rich crops of corn and turnips are seen on the one hand, and luxuriant pastures in the valleys below, it will generally be found that a most important change has taken place in the soil and subsoil; and the transition is often exceedingly abrupt.

Facilities of export and import.

The county has a very fair share of railway accommodation, having direct communication with London and Birmingham on the west, by the North Western, and also with London and the North of England by the Great Northern, at its eastern extremity at Peterborough. And these two trunk lines are accessible to a great portion of the county by means of the Northampton and Peterborough Branch, running from Blisworth through the heart of the county down the Nene Valley to Peterborough; and secondly by the nearly completed line which, skirting the northern edge of the county, joins Rugby with Peterborough and the intermediate towns of Stamford and Market Harborough; and thirdly by an extension of the Buckingham Branch through Brackley to Banbury; besides other lines too numerous to mention here connecting these with the eastern and western extremities of the kingdom.

Next to the railways may be mentioned the Union, Grand Junction, and Oxford canals, and the Nene navigation from the sea near Boston, by Peterborough, to Northampton; all of which (excepting the Nene) are still extensively used for the conveyance of corn, coal, timber, and other heavy goods.

Geological features.

The substrata of the county are all comprised in the *oolitic series* of the *secondary system* of geologists, and include the following formations or deposits.

Fourfold classification.

First, Oxford Clay (here commonly called *gault*).

Second, Great Oolite, consisting of a variety of limestone rocks, with or without various incumbent masses, of chalky clay, sand, gravel, and loam.

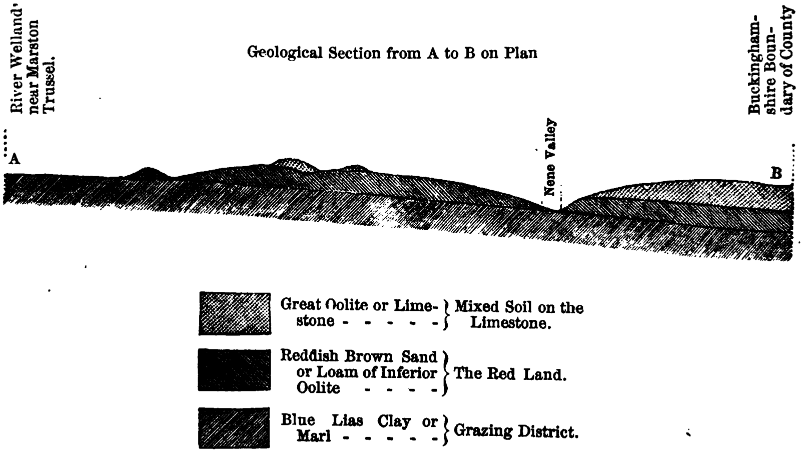
Third, Inferior Oolite, consisting principally of a loose rubble rock, of a dark reddish-brown colour, which becomes more decomposed as it nears the surface of the ground, forming a deep porous subsoil, its deep colour being derived from the red oxide of iron, with which it is highly impregnated.

Fourth, the Blue Lias Clay, or marle.

As these various substrata (making due allowance, however, for one being sometimes partially blended with another,) all have a distinct and peculiar influence upon the productive

Soils much intermixed.

powers of the surface soil, I shall make them the four agricultural divisions of the county. The boundaries, however, of the different formations are so very whimsical and irregular, that to attempt to define them accurately by writing would become a very tedious matter; I have, therefore, constructed the accompanying map from my own personal acquaintance with most parts of the county, confirmed by a recent inspection and comparison with some of the best authorities, as being the most concise method of conveying to the reader a pretty accurate general idea on the subject. In the absence, also, of any authorised geological section on a large scale, I have compiled the annexed section, taken transversely, of the county, at the line A B on plan, which shows how the different formations are deposited upon, and sometimes isolated and detached from, one another:—


Geological Section from A to B on Plan

River Welland near Marston Trussel.
A
Nene Valley
B
Buckinghamshire Boundary of County
Great Oolite or Limestone - - - - - Mixed Soil on the Limestone.
Reddish Brown Sand or Loam of Inferior Oolite - - - - The Red Land.
Blue Lias Clay or Marl - - - - - Grazing District.

Elevation of the county above the sea.

From its central position in the island, it is not remarkable that the average elevation of this county above the level of the sea should be rather considerable; for, although by following the valley of the Nene the ground gradually falls, and at its termination in the Fen arrives at a very low level, still the average elevation of the county is probably between 200 and 300 feet above the sea level, and at Arbury Hill, near Daventry (the highest point), it attains to the height of 735 feet above the mean level of the sea, and at Naseby church-yard, which is about the centre of the high table-land extending over the parishes of Naseby and Cold Ashby, the elevation is 621 feet.* This used generally to be considered the highest point in the county, probably from its giving rise to the three rivers before named; another point in Naseby lordship is calculated to be 15 feet higher than the church-yard, making the total elevation 636 feet.

Disadvantages of elevation counteracted.

Notwithstanding its elevated position, the great natural fertility of the county is accounted for by the peculiar property of the red soil (which extends over all the highest eminences) of attracting ammonia from the atmosphere, and retaining it,† its adaptation for absorbing the sun's rays, as well as from the rapidity with which the rain sinks through it, and further by the small annual amount of rain that falls in these districts, and the consequent reduction in the amount of evaporation, with its accompanying cold, that follows;‡ and, whilst we reap the full benefit of warmth from the mild south-western breeze, we do not suffer to the extent of other counties from its characteristic humidity and wet, for, the moisture being previously condensed and discharged in the shape of rain upon the high grounds and hills of the less fortunate counties which flank us on the south and west, fresh and comparatively dry the delicious zephyr meets us, imparting health, sprightliness, and vigour to both men and plants, in place of that relaxation of the frame which its dampness imparts in other localities nearer the coast.

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* These are the elevations as ascertained a few years since by the observations of the Royal Engineers, who had stations at both Arbury Hill and Naseby in conconducting the Ordnance Survey, and I was favoured with these particulars from Captain Yolland, R.E., of the Ordnance Office at Southampton. The elevations in all previous publications have been incorrectly stated.

† See Liebig.

‡ It is a fact worthy of note that the annual mean depth of rain that has fallen in this county for the last 13 years, from 1838 to 1850 inclusive, is no more than 21 inches and 77 hundredths; this statement is obtained from a register regularly kept at Althorp House, the seat of Earl Spencer, near Northampton, access to which has been kindly granted me. Althorp House stands at an elevation of 310 feet above the level of the sea, or about the mean level of the county, and, holding as it does a very central position, may be taken as a good criterion of the whole. This quantity of wet compared with the annual fall of rain at 67 different places spread over England, Scotland, and Ireland, as given in table No. 4 of Mr. Whitley's admirable essay "On the Climate of the British Islands in its Effect on Cultivation," published in the Journal of the Royal Agricultural Society, shows that only three out of 67 localities experience a less fall of wet than Northamptonshire: namely, Thetford, which stands 19 inches, Cambridge 20 inches, Aylesbury 21 inches.

Effect of elevation on quality of grain.

The highest spots in the county are all in a high state of cultivation, and at no place more than at Naseby has a greater amount of science and capital been expended, and I fear, to a certain extent, wasted; and there we have an excellent illustration of the theory laid down by Mr. Whitley. Wheat, barley, oats, and turnips are all largely cultivated at Naseby; the oats and turnips produced are of excellent quality and abundant quantity; the wheat and barley also sometimes yield well, and are very abundant in straw, but the quality of the grain is inferior, and, on an average, does not fetch so much in the market by three or four shillings per quarter as corn grown in the neighbourhood of Northampton; the crops are also later in ripening, and frequently the Naseby farmer is in the middle of harvest when his neighbour five miles off has done, and is laughing at him. The same red friable soil, so general in that part of the county, is also prevalent at Naseby, and when subjected to a chemical analysis has been found to contain the same ingredients as the red soil near Northampton, than which no land in the kingdom produces better samples of wheat and barley. Where, then, lies the difference? Why, Naseby is 630 feet above the level of the sea, and the land about Northampton but 200: 600 feet is the level which Mr. Whitley lays down to be the altitude at which "wheat fails to come to that perfection which justifies its cultivation to the exclusion of another crop." One might have supposed that our dry atmosphere and the warm congenial nature of the soil would have considerably modified this rule; but experience seems to show that the general conclusion holds good even at Naseby, to which place immense quantities of lime have been carted a distance of 12 miles, and every species of artificial manure tried, with the expectation of producing corn equal in sample to that of other districts; affording a useful lesson and warning to future agriculturists not to sink their capital in fruitless attempts to contend against so insuperable an adversary as the laws of Nature.

Meteorology. The following table, which I have compiled with great care from the meteorological observations that are daily made at Althorp, the seat of Earl Spencer, gives the mean Temperature, and rain that has fallen, for the last ten years.

The thermometer hangs in a north-eastern aspect, about five feet from the ground and a foot from the wall; Althorp stands in a low and somewhat damp situation with respect to the country immediately adjoining, and moreover at a considerable elevation above the level of the sea, all of which causes conduce to lower the temperature of the atmosphere, and account for the somewhat cold result arrived at by the tables, which, however, if taken as the mean temperature of the county, is, in an agricultural point of view, more than compensated for by the warm and more equal temperature of the soil, and the dry invigorating climate.

TABLE showing the Mean Temperature of each Month: of Summer; of the whole Year; difference between the Hottest and Coldest Month; and the Quantity of Rain that has fallen, for a series of Ten Years.

SUMMER.

YEAR.	JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.		JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		YEAR.		Summer Temperature.	Diff. of H. and C. Month.
	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.	Ther.	Rain.		
1841 . . .	32.17	0.68	33.87	0.48	43.60	1.15	44.71	0.80	54.35	0.92	54.15	2.63	56.99	2.50	57.91	2.48	55.29	3.46	46.58	3.27	39.86	3.36	38.18	1.72	46.47	23.45	56.35	25.74
1842 . . .	30.12	1.12	37.15	1.62	43.39	1.95	43.41	0.52	49.24	2.59	57.02	2.73	56.97	2.08	61.77	1.31	54.13	2.94	43.49	0.87	40.58	4.37	42.97	1.09	46.68	23.19	58.58	31.65
1843 . . .	37.95	1.61	34.32	2.64	41.18	1.20	46.26	1.40	50.00	4.13	53.79	2.51	58.60	2.05	59.30	2.26	56.36	0.82	45.27	4.01	41.15	1.87	43.47	0.36	47.30	24.86	57.23	24.98
1844 . . .	37.83	1.23	32.86	2.62	40.14	1.89	47.96	0.12	49.38	0.15	57.70	0.53	58.86	1.97	55.34	2.44	52.58	1.81	44.45	2.25	41.82	2.83	32.00	—	45.91	17.84	57.30	26.58
1845 . . .	37.54	1.57	31.46	0.35	34.52	1.15	45.58	1.04	48.37	2.59	57.82	1.89	53.92	2.64	55.78	2.82	50.98	1.65	47.24	1.14	42.83	1.79	38.34	2.05	45.36	20.68	55.84	26.36
1846 . . .	41.38	2.77	42.18	0.95	40.09	1.59	44.94	3.29	52.08	1.10	61.52	1.26	62.18	2.37	60.99	2.60	56.53	1.64	46.83	4.66	42.76	0.59	30.79	0.92	48.52	23.74	61.56	31.39
1847 . . .	34.94	1.78	34.29	1.24	37.81	0.63	41.70	1.02	52.67	3.35	55.86	1.58	61.22	0.97	58.21	0.96	50.60	1.55	49.69	3.53	43.95	1.58	39.50	2.49	46.70	20.68	58.43	26.93
1848 . . .	32.01	0.66	40.60	3.13	40.06	2.57	44.36	1.64	53.45	0.39	56.40	4.48	58.42	2.97	55.21	2.96	51.63	4.64	47.37	4.03	38.98	1.04	39.45	1.63	46.50	30.14	56.68	26.41
1849 . . .	37.70	1.95	42.36	1.67	42.63	1.12	44.20	2.59	55.45	2.24	56.42	1.89	58.55	2.28	59.55	0.55	56.95	3.48	49.35	2.33	42.43	0.98	37.50	2.55	48.59	23.63	58.17	22.05
1850 . . .	33.01	0.90	43.45	0.15	40.05	—	49.42	1.67	51.10	1.52	60.79	0.31	62.50	3.24	58.84	1.80	54.16	1.96	46.07	1.31	44.95	2.17	39.26	1.16	48.63	16.28	60.71	29.49

AVERAGE OF THE TEN YEARS.

	35.47	1.43	37.25	1.48	40.35	1.33	45.25	1.41	51.60	1.90	57.15	1.98	58.82	2.30	58.29	2.03	53.92	2.39	46.63	2.74	41.93	2.06	38.15	1.40	47.06	22.45	58.08	27.16

II.—Present Management.

First Division—OXFORD CLAY.

Subsoil 1.

This formation merely touches upon the eastern boundary of the county, where the counties of Bedford and Huntingdon join it; it constitutes, however, with some occasional intervening beds of gravel, the principal sub-stratum of the

Fen soil.

Subsidence accounted for.

Fen District; the surface soil of which is an alluvial deposit, consisting of black bog earth, composed almost entirely of decayed vegetable matter, varying in thickness from two to eight feet, the usual depth being about three feet. A constant change in the depth of bog is, however, gradually taking place, as forty years ago, where clay could not be found at the depth of six feet, it is now obtained within three feet of the surface: hence arises a common error amongst fen farmers, who imagine that the clay rises by the gradual conversion of the vegetable matter into clay; whereas the only rational conclusion is, that the peat earth is worked down and consolidated by constant cultivation, and reduced by the process of burning the surface, and further subsides upon the withdrawal of the water by improved drainage; this subsidence is very evident by the position of houses which had been erected level with the surface of the ground, upon piles driven into the subsoil, having their foundations now two or three feet above the level of the ground.

The Fen District of Northamptonshire is but small, extending to about 8,400 acres only, of which Newborough contains 6,000, Oldborough 2,000, and Northborough about 400 acres.

Newborough.

Mismanagement at Newborough.

A great change has taken place in the aspect of Newborough since the time of Pitt;* what was then a swampy common, frequently under water, is now a regular, inclosed parish with its church, parsonage house, inn, and a good sprinkling of cottages; but the farming generally is very exceptionable, the land being divided into an infinity of proprietaries, and occupied for the most part by persons who reside in upland parishes from five to ten miles distant, who have made a practice of conveying the whole of the produce home, without taking anything in the shape of manure back, and consequently the fertility of the soil, although naturally very great, has been considerably impaired.

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* Pitt's Report on the Farming of Northamptonshire, 1806.

Oldborough Fen.

Oldborough Fen, being divided into larger farms, and occupied by persons resident on the spot, is in a very superior condition, but here even the system of farming is exceedingly capricious.

A course of cropping, once very general, but now discontinued, was: first, seeds to lie two or three years, and then pared (by ploughing very thin with one horse) and burnt—this was effected at a cost of not more than 7*s*. 6*d*. per acre; coltseed or mustard was then immediately sown, which was eaten off by sheep in the autumn; fourth year, oats; fifth year, wheat; sixth year, beans or potatoes; seventh, wheat, then seeds again for two or three years. Landlords have now cancelled the agreements stipulating that seeds are to lie three years, the wireworm being thereby encouraged, to the great injury of the tenant. The practice of paring and burning also is now quite discarded, the greatest permanent and certain improvement being effected by the application of clay, which is performed in the following manner: trenches are dug three feet in width and eleven yards apart, measured from centre to centre. The peat earth being removed, two "draws," or about three-quarters of a yard in depth, of clay, is taken out and thrown on either side the trench to the distance of five yards. About a rod in length is opened up at a time, and the peat moss of each new length is thrown forward into the trench from which the clay had last been taken. An excavation to the above extent affords a dressing of 330 cubic yards of clay per acre, covering the land to the depth of two inches and a half nearly, when equally distributed. Six pence per rod is paid for the work, which thus costs 2*l*. per acre, and lasts for twenty years. The quality of the corn is greatly improved, but generally speaking the quantity not materially increased, by claying, but at the same time a fair average crop may be calculated upon with much greater certainty, particularly after a severe winter, the black bog being frequently puffed and raised up to

Clay dressing how done.

such an extent by the frost, that a strong wind following will sometimes actually blow the young wheat out of the ground, which casualty is obviated by the consistency and weight imparted to the soil by the clay.

General course of cropping.

Coltseed is now considered to be the most advantageous green fallow crop, and a course of cropping in Oldborough Fen now very prevalent is as follows: first year, coltseed, sown in July after a fallow. A quarter of a peck of seed is used to the acre, drilled in rows eighteen inches apart, with six to ten bushels of bone manure mixed with ashes and saturated with liquid night-soil. This should be done three or four weeks previous to being used, to accelerate the decomposition of the bones. The coltseed is cleaned by horse and hand hoeing, and the plants thinned down to eight or nine inches apart. This crop is eaten off by sheep, commencing about September, and must be consumed more or less early as oats or wheat are intended to follow. Second year, oats; third year, wheat (or *vice versâ*); fourth year, beans or seeds. The former are taken but once in ten years or so, being considered an uncertain crop, and when it fails the ground is inevitably smothered with weeds. Potatoes or mangold may be taken instead; the former is sure to be followed by an excellent crop of wheat, and was moreover itself a very profitable crop formerly, producing from 100 to 120 sacks of three bushels each per acre, but since the prevalence of the potato disease the cultivation of them has been quite discontinued; mangold is a more certain crop, and grows to a large size, but exhausts the land very much, and in consequence is not so desirable before wheat. Fifth year, wheat; sixth year, seeds; seventh year, wheat.

Irregularities of management.

But it is scarcely possible to lay down a definite system as carried out in this district. One part of a farm being deficient in drainage is cropped when and how the season will permit, whilst another portion more advantageously placed is made to do double duty, and instances occur where wheat and potatoes have been grown alternately upon the same field for near twenty years with advantage.

Mr. Williams's farm.

I must not take leave of this division without noticing the commodious little establishment of Mr. Joseph Williams, who occupies 104 acres of land in Oldborough, of which 69 are grass and 35 arable. He has entirely at his own expense, and without the advantage of a lease, constructed suitable shed accommodation for 63 head of cattle, all of which are now to be seen (January, 1851) in every stage, from calves to cows and bullocks ready for the butcher, besides three cart horses, one nag, and two colts; he keeps no sheep, but takes in a few belonging to other parties "to joist" at times. The arable portion of his farm lies so low (being in some places but a few inches above the level of the water in the side ditches) that Mr. Williams finds it necessary to take a bare fallow in wet seasons, after which two white straw crops and then fallow in the shape of a green crop. It is but fair to the landlord to state that Mr. Williams has lately had a lease granted to him.

A natural outfall has been obtained for this portion of the fen of late years, and all the mills which were formerly used in lifting water for the drainage are now dispensed with.

Fen drainage.

The under-draining of the Fen District is notwithstanding very imperfect. Wood is the material principally used for filling the drains, it being asserted that pipes and tiles are of no use, as they shortly become completely filled with a red ferruginous matter; but this appears not at all wonderful, seeing that it is the practice to keep the mouths of the drains completely under water, by holding up the water in the ditches by means of sluices to within a few inches of the surface of the ground, thus stopping all flow of water from the drains, by which they might clear themselves. It is necessary to hold up the water for the supply of the cattle in summer, there being no other means of obtaining that necessary commodity, but it always appears to me to be kept at a very unnecessary height.

The breeding of sheep has been discontinued, from the heavy losses sustained by rot amongst the ewes, the sheep as well as the cattle being now generally bought in, and sold off when fat; the breed of sheep kept are "improved Lincolns."

Second Division—THE LIMESTONE.

Comprises great variety of subsoil.

The limestone formation is by far the most extensive in the county, stretching from one extremity to the other, and overspreading the entire breadth of the northern portion of it from Huntingdonshire to Rutland. Where the limestone is immediately below the surface, the soil is light and stony, well adapted for the growth of white turnips, but apt to burn up in dry weather. The greater part however of the limestone formation is overspread with diluvial deposits of various extent and thickness, comprising chalky clay, marl, sand, gravel, and loam, and embracing a great variety of soils; but I have thought it best to class them together, as the changes are so frequent and uncertain that it is impossible to assign any particular locality to them, and they frequently occur not only upon the same farm, but I have seen every variety exposed to view by a drain cut through a single field.*

Erratic formations.

Rotation of crops to suit the soil.

The light land on a farm is usually cultivated upon the five-course system, and the heavy division on the four-course, thus:—

Light Division.—First, turnips; second, barley; third, seeds; fourth, wheat; fifth, barley or oats.

Heavy Division.—First year, vetches; second, wheat; third, beans; fourth, peas, barley, or oats.

LIGHT LAND.

Method of folding sheep on turnips.

Very few turnips are drawn for stall-feeding in this county, the crop being almost exclusively reserved for the sheep, and fed off upon the land. The turnip-tops being considered not so good for the lambs, the old sheep that are intended immediately for the butcher (their few remaining front teeth being either drawn or broken off to prevent them from eating the roots) are first allowed to go amongst the turnips, and soon become exceedingly fat upon the tops, the lambs follow and consume the upper half of the roots, and have besides an allowance of hay, and the breeding ewes clean up after them, but instead of hay are foddered with barley straw.

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* This may be seen upon the Rev. T. Scott's farm at Wappenham. In a lime pit on the same farm there is a bed of clean gravel 40 feet in thickness, then eight feet of limestone, and below that an excellent bed of freestone.

Stock.

A farm of 180 acres, of which say 100 are pasture, adjacent to the river Nene, will usually carry about 40 head of cattle, of various ages, eight of which are milch cows, besides 200 sheep, 80 of which are breeding ewes, and sends about 20 fat beasts to market yearly. The stall-feeding is insignificant: those oxen which could not be got into condition by November are crammed into a variety of, generally speaking, the most comfortless and inconvenient of sheds or yards, tied up and finished with about half a bushel of turnips, a gallon of bean meal, and as much hay as they choose to eat per day, and are sent to market about Christmas or soon afterwards.

Mr. Webster's system on light land.

The system adopted by Mr. Webster of Peakirk, who farms extensively upon light land, is worthy of note. The cultivation is carried on upon the six-course shift.

The wheat crop is mown close to the ground, tied up and raked (this can be done for 8*s.* per acre, without beer): the land is then immediately scarified with the pointed tines, and crossed in a contrary direction with the broadshare of the scarifier. This kills the weeds then growing, and, the land being then left for some weeks, the scarifying causes to vegetate the self-sown seeds of weeds which may have previously ripened; which also are killed when the land is ploughed up for winter beans. This being the fallow crop, they are drilled in rows 27 inches apart in October; the beans are horse-hoed and cleaned in the spring, and between each row Swede turnips are drilled. The beans (which ripen early) are pulled up and tied, which costs 6*s.* per acre; they are then set up in single rows wide apart, to make room for the horse-hoe, which is immediately applied to the turnips, and there is soon no appearance of another crop having been upon the ground. In carrying the beans the wheels of the carts pass between the alternate rows of turnips, the horses walking up the middle row; thus Mr. Webster, in addition to a fair crop of turnips, gets three quarters of beans to the acre, and this is the only fallow crop taken. Second year, barley; third year, clover fed off by sheep; fourth year, wheat; fifth year, winter beans; and so soon as they are cut the land is scarified and sown with half a peck of mustard and coltseed per acre, which is eaten off with lambs, and the land immediately ploughed up. Sixth and last year, wheat.

I can only repeat Mr. Webster's own words (on a public occasion) to those who are sceptical as to the success of this system of cropping, that "they who do not believe must come and see." I visited his farm in December last, and can speak as to the turnips which were grown between the rows of beans as being a very fair average crop. All corn grown upon this farm is mown and tied up in sheaves (except the winter beans, which, as I mentioned before, are pulled when turnips are grown with them). It is a neat and saving plan, and worthy of more general adoption. Mowing and tying barley costs on an average 6*s*. per acre, without beer.

It may be objected, that the above plan will considerably add to the amount of work to be done in harvest-time, when all labour is dear; but the great advantage of getting the land properly cleaned (and all agree that that is the best season for effecting that desirable object) will in my opinion fully compensate for the additional outlay.

It must be confessed that Mr. Webster has the advantage of first-rate land for carrying out his system upon, the staple being deep, upon a subsoil of gravel which requires little draining.

THE HEAVY LAND.

Best managed heavy soils.

Bare fallows are almost universal upon the heavy land, but a few of the best farmers who have their land thoroughly drained, dispense with them by taking green crops of coltseed, cabbages, and tares; second year, barley or wheat; third year, seeds, and so on. The seeds are fed off by the lambhogs, which sometimes have an allowance of cake besides, at the rate of half a pound per day, beginning with a quarter of a pound at first; this not only greatly improves the condition of the sheep, but the richness imparted to the manure by such high feeding is found to improve the succeeding wheat crop to the extent of one quarter per acre.

Third Division.

The red land.

We now come to that important characteristic of the county the Red Land, which extends pretty generally over the west and north-west portion of the county, capping the hills and eminences. The substratum is a red, ferruginous sand* or rotten rock, called here "*keal,*"† the surface soil being merely the rock in a decomposed and disintegrated state, with an admixture of loam and vegetable matter. This soil produces all kinds of corn and root-crops in the greatest abundance and perfection, the wheat grown upon it occasionally yielding seven quarters per acre, but the average yield may be taken at five quarters of wheat, six of barley, and seven of beans; oats are not much grown, the red land being considered too good for them.

Its richness.

Best system upon it.

The rotation of crops varies in different places; but, as it is more for the benefit of the community to publish and disseminate the good than to expose bad practices, I shall proceed to detail the system of cropping carried out by Mr. Jones, of Middleton Lodge, near Banbury, who, having been thirty years a tenant of the same farm, may be credited for being pretty well acquainted with its capabilities.

The rotation of crops extends over seven years.

First year, part rye and part vetches, sown broadcast in September on separate portions of the field, two bushels and a half of the former and two bushels of the latter being used, the land being well manured beforehand with 12 to 15 loads of dung per acre; and upon this warm dry soil the manure cannot be applied in too *green* a state, as it is called—that is, it should be taken direct from the farm-yard to the land, and ploughed in as quickly as possible. The undecayed fragments of straw absorb and retain the wet which falls upon the land, and prevent the ground from becoming too dry and hot; and, however fresh the dung may be when laid on, its fertilizing properties are completely exhausted by one crop on these light lands, which have in consequence obtained the name of "hungry land." These remarks do not hold good with cold, heavy soils, where it is always found that rotten manure produces the best crops.

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* The ferruginous qualities of this rock are in some cases so great that, since the above was written, the attention of the Staffordshire ironmasters has been attracted, and large quantities are now weekly conveyed by Railway from Northampton to the Staffordshire ironworks. At Rothwell, near Kettering, the ironstone is found to be twelve feet in thickness, yielding 50 per cent. of iron, and lies but a few inches below the surface of the ground. The whole county at the present moment is in an excited state on the subject, and doubtless we shall ere long have numerous ironworks erected. I trust, however, that the treasures below the soil will not render our landed proprietors neglectful of the surface. The dreary moors of Lanark and Ayrshire have but their coal and iron to boast of, but the mineral treasures of our more favoured county are found in a climate most congenial to vegetation, and are covered by a soil matchless in the kingdom.

† Pronounced *kail.*

The rye and tares are eaten off early with sheep, which have also an allowance of Swede turnips given them. The part consumed first is sown with Swedes in May or early in June, the remainder is sown with white turnips; two pounds of seed per acre of both sorts being used.

Second year, barley (the "Chevalier"), sown in April or very early in May.

Third year, winter beans, put in at the end of September, being drilled in rows 22 inches apart, with two bushels of seed per acre. These are horse-hoed in spring as deep as a ploughing, and drilled with white turnips between the rows, with two pounds of seed per acre; these are eaten off with sheep after the beans are housed.

Fourth year, wheat, part dibbled with one bushel and a half of seed per acre, and part drilled with two bushels per acre, the wheat-sowing generally commencing about the beginning of October, and ending about the middle of November. After harvest the sheep are folded upon the wheat-stubble, Swede turnips and hay being supplied to them.

Fifth year, barley, three bushels of seed being used per acre, and red clover sown amongst it, at the rate of 15 pounds of seed per acre.

Sixth year, clover, mown twice for hay, and fed afterwards with sheep. The succeeding crop of wheat is found to be much better after the clover has been mown twice, than when mown once, and afterwards eaten with sheep. The crop of hay protecting the land from the heat of the sun in summer, it is in a much more moist and suitable condition for receiving the wheat in autumn.

Seventh year, wheat (drilled), which is generally folded with sheep to solidify the land, until the wheat comes up.

Great benefit of sheep.

Mr. Jones uses neither oil cake nor artificial manure, a large and excellent flock of sheep being his stronghold; their breed is a cross between the Gloucester and Leicester: the constant treading upon and consolidating of the land by the sheep being more beneficial even than the manure that they leave upon it.

Advantages of this soil.

One peculiar advantage of the red land is, that it seldom requires any artificial draining, from the friable nature of the soil, and the porous character of the loose sandy rock below. This, combined with the power of absorbing ammonia from the atmosphere, mainly contributes to give it so high a character in agriculture. Mr. Jones's farm is an excellent specimen of this description of soil, the staple being sound and several feet in thickness, and possessed of just the proper amount of tenacity.

Mr. Jones asserts that if farm produce was commanding a fair price he could better afford to pay 50*s.* per acre rent if allowed to farm on his seven-course system, than he could 30*s.* and be tied down to the four or *five field* practice, and the following comparison of produce by the two systems, calculated at present low prices, shows the superiority of the seven-course shift:—

Comparison of Mr. Jones's and the usual course.

Seven-course system as practised by Mr. Jones:—

			£	*s.*	*d.*
1st year.	Rye and Vetches .	1½ ton at 40*s.*	3	0	0
Ditto	Turnips . .	18 tons at 6*s.*	5	8	0
2nd year.	Barley . .	6½ qrs. at 21*s.*	6	16	6
3rd year.	Winter Beans .	4 qrs. at 27*s.*	5	8	0
Ditto	Turnips . .	15 tons at 6*s.*	4	10	0
4th year.	Wheat . .	5 qrs. at 40*s.*	10	0	0
5th year.	Barley . .	5½ qrs. at 21*s.*	5	15	6
6th year.	Clover (mown twice) .	3 tons at 40*s.*	6	0	0
7th year.	Wheat . .	5 qrs. at 40*s.*	10	0	0
			7)56	18	0
	Average produce of one year per acre .		£8	2	6¾

The usual five-course system :—

			£	s.	d.
1st year.	Turnips . .	18 tons at 6*s*.	5	8	0
2nd year.	Barley . .	6 qrs. at 21*s*.	6	6	0
3rd year.	Seeds (Hay) . .	3 tons at 40*s*.	6	0	0
4th year.	Ditto ditto . .	3 tons at 40*s*.	6	0	0
5th year.	Wheat . .	5 qrs. at 40*s*.	10	0	0
		5)	33	14	0
	Average of one year .		£6	14	9½
	Produce of one year by seven-course system .		8	2	6¾
	Ditto ditto five ditto ditto .		6	14	9½
	Balance per acre per annum in favour of Mr. Jones's system		£1	7	9¼

The above calculation makes no allowance for the additional quantity of stock that the increased bulk of straw will enable the land to carry, which it is evident gives an additional advantage to Mr. Jones's plan.

Beneficial effects of clay upon red land.

In many localities the proximity of the red kealy rock to the surface, in conjunction with a dry season, occasions great loss to the farmer, by the difficulty experienced in obtaining "a plant" of clover and seeds, and the failure and burning up, as it were, of the turnips and other crops. These defects and losses may be, in a great degree, counteracted by the application of clay. Mr. John Gaudern, an enterprising farmer at Earl's Barton, stands almost alone in the county as one who has extensively applied it to red land, and the success of the process has been complete, and beyond his most sanguine expectations. The clay he has used is the deep blue marl of the Lias formation, free from stones and calcareous matter. It crops out from below the red sand at the escarpments of most of the hills in that locality, and extends across the valleys. Mr. Gaudern has dressed the land with it at the rate of from 60 to 100 cubic yards per acre, putting on the larger quantity where the land is *sharpest* and most subject to burn, the average dressing being 80 cubic yards per acre, which covers the land rather more than half an inch in thickness. I have been favoured by Mr. Gaudern with the following particulars of the expense of the application:—Where the distance to cart the clay does not exceed a quarter of a mile, it is performed by a gang consisting of five men and two boys, with three carts and five horses, viz. four men to fill, two boys to drive, and one man to lay down and spread; the price paid for digging, filling, driving, and spreading is 4*d.* per cubic yard (measuring the pit), and the horse-labour and wear and tear of tools and carts is estimated at 5*d.* per yard:—

	£	*s.*	*d.*
80 cubic yards filling, &c. at 4*d.* . .	1	6	8
80 ditto ditto carting at 5*d.* . .	1	13	4
Total cost per acre . .	£3	0	0

The set described will complete an acre in two days, and the men will thus earn 2*s.* 6*d.* per day each, the boys 10*d.*, and leave 2*s.* 6*d.* per day for the horses each, and 1*d.* per yard for the wear and tear of carts and tools; which is rather a larger allowance for wear and tear than is perhaps necessary. It is very good wages for the men, but the work is proportionably hard.

The clay may be applied at all times of the year, whenever there is leisure, and the horses can be spared, as this land is not injured by being carted upon in wet weather. Mr. Gaudern prefers, however, putting the clay upon seeds the first year, after the grass has been mown twice, or, which is the same, been eaten off pretty close, as the cartage is easiest at that time, and the clay lies exposed to the atmosphere the whole of the next year, causing the lumps to fall and combine more perfectly with the soil.

This clay, in addition to the property of all clays, of giving solidity to the land, and arresting and retaining the nutritious properties of manures, which would otherwise pass rapidly away through a sandy soil into the subsoil below, evidently has a strong inherent fertilising property in itself, particularly to clovers and grasses, which I shall further advert to hereafter, and hence it is not surprising that the clovers and sēeds have more especially benefited by it; to use Mr. Gaudern's own words, "half the quantity of seed (clover and rye-grass) sown now produces twice the plant" that he was formerly able to obtain; the turnip-crop has also been increased four tons per acre, and other grain in proportion. It seems a great pity that this practice should not be followed out by others. Some plead the want of clay, others that the improvement is too expensive for a person not protected by a lease, being one that remains good for 20 years. At the same time I would warn any one who intends trying it to begin somewhat cautiously at first, as I have heard of more than one instance in which the application of clay upon light land was said to be a failure. I have not been able to obtain the particulars of those cases where success is reported not to have followed the process, but possibly the dressing might have been overdone in quantity.

Mr. Gaudern has adopted the six-course shift upon the red land which has been dressed with clay, thus: first, turnips and mangold; second, wheat; third, seeds; fourth, seeds; fifth, wheat; sixth, barley.

FOURTH DIVISION.

Blue Lias.

Where chiefly found.

The fourth and last agricultural division is that soil which lies immediately upon the Lias Clay. It is found most extensively upon the north-west limb of the county, but it also occurs in nearly all the vallies and low-lying plains, except where it is hidden, as in the valley of the Nene, by beds of gravel, sand, &c.

This soil introduces the subject of grazing.

Fertilizing properties of subsoil.

All the richest grazing lands of the county rest immediately upon the Lias Clay, without any intervening deposit; and it is most interesting to observe (as before hinted) how the herbage derives its luxuriance immediately from the subsoil, which may be principally owing to its bituminous properties. In all the best feeding pastures in the neighbourhood of Market Harborough the grass is most abundant where the vegetable mould is but of moderate thickness, and a rich unctuous clay, soapy to the touch, close to the surface. There are fields of this description in the county that fatten one bullock and two sheep to the acre in a year, and without being renewed by artificial means remain unimpaired notwithstanding the drain that has been made upon them for generations, in the shape of fat beef and mutton, which is annually exported in such large quantities; in fact, the best species of grasses and white clover seem indigenous to the soil, as is seen by the spoil-banks which have been thrown out from the canal and railway tunnels from depths of 50 to 100 or more feet below the surface, which have received a mere sprinkling of soil, probably not more than one or two inches, and are now covered with grass growing in rank profusion; and any one coming fresh from another district must be struck with the appearance of the ditches, which are lined to the very bottom with rich herbage. Another remarkable instance of the case in point may be seen in the parish of Rothwell in a field upon the slope, or (as they are called) "hangings," of a small valley called Harrington Dale. This close had for many years been in the hands of a very indifferent farmer, who continued cropping it for many successive years, until it was quite run out and exhausted; it was then left waste, and now, as if the subsoil had come to the relief of the exhausted surface, without a seed sown or a load of manure laid on, it has become a complete bed of white clover and grass, and will "feed" a bullock, which is a term that we apply only to the best pastures, indicating that a bullock will fatten upon them fit for the butcher. Some persons may attribute the fertility of these grass lands to the property of the clay subsoil, in common with all clays, to intercept and retain the properties of manure which would otherwise be lost through a subsoil of gravel or sand, as also to its affording moisture to the roots of the grass during the dry weather of summer. This may be partly the case, but by no means altogether; for, if so, we should find pastures upon subsoils of Oxford and chalky clay equally rich and productive, which is not the case (except where great depth of soil occurs, with a diluvial deposit intervening).

Thickness of the Lias formation.

The Lias formation is of considerable thickness in this county, being found to be 400 feet at Kingsthorpe, near Northampton, where a few years since a futile attempt to discover coal was made by sinking a shaft through it, contrary to the advice of all geologists, including Dr. Buckland, who when he visited the spot facetiously observed, "You may fry me over the first shovel-full of coal that comes out of this pit." I might further observe of this undertaking that, after going to the depth of 1000 feet, salt springs were tapped, which, overpowering the engines, compelled them to abandon the concern altogether, after an outlay of 20,000*l.* By the Artesian boring which was sunk at the Northampton Railway Station, the Blue Lias Clay was found to be 550 feet in thickness.

Routine of grazing.

One of the great features of this county is the summer "feeding" of cattle upon the pastures, principally for the supply of the London market from July to December; and, the richest pastures being (as I observed before) upon the Blue Lias formation, I shall here give an outline of the usual routine of a grazier's business. The management of the soil when compared to that of arable land is exceedingly simple, the skill and judgment of the grazier being principally displayed in the selection and purchase of the lean stock. The land, however, requires thorough draining, especially where the subsoil is clay, and it is now generally done with tiles; and, such is the difference made by this improvement alone, that in many places 40 bullocks can now be grazed upon a pasture which 15 years ago would carry but 30. The grass being thereby raised earlier in the season, and the ground being rendered firmer to the tread, the heavy beasts can be admitted sooner in the spring without risk of poaching the soil. Another point which the careful grazier pays particular attention to is, that the grass in the pastures be evenly eaten off by the cattle in every part, and not allowed to grow in long tufts, which are rank and unpalatable to the taste; for this purpose the droppings from the cattle are regularly collected and carted into a heap in one corner or centre of a field, which, being mixed with lime, and perhaps a portion of soil obtained from any old bank that requires removing, forms an excellent top-dressing for the land, and is the only manuring which it generally gets or requires; and it is laid on during the frosty weather in winter. If after this there are still coarse tufts of grass which appear to be avoided by the cattle, a sprinkling of manure-salt is applied, which sweetens the herbage, and the cattle immediately take to it, and, being eaten off closely, a superior quality of grass springs up. The salt need only be applied at the rate of one cwt. to three hundredweight per acre; and the cost of it is now 17*s.* to 20*s.* per ton at the wharves. As small a portion of a grazing farm as possible is usually cut for hay, frequently not more than 20 acres out of 300, mowing being always considered weakening and detrimental to grass-land.

The lean cattle are bought in between the 1st of March and the 29th of April, at the fairs in the neighbourhood, and are of any or all of the following breeds: viz. North Wales, South Wales, Herefords, Irish, Shorthorns, and Devons. The home-bred Durham Shorthorns are much esteemed, as combining in a great degree the two essentials of weight and quality, but cannot always be bought so advantageously as some of the other breeds. The North Wales are also much thought of by some people. The experienced grazier, however, cares very little about the breed, so long as he can buy his cattle "right," that is, worth the money, and likely to pay a good percentage on the outlay. The cattle are kept in yards upon straw and hay until the beginning of May. This allows the grass to come to a good head, and the ground to become firm; poaching by the animals' feet being, as I hinted before, very detrimental to the land. As the oxen are brought into the best pastures, the sheep are sold off, so as to have the land entirely stocked with beasts by the end of June or beginning of July; a few sheep being retained upon the upland pastures, and some of them occasionally introduced amongst the oxen, when there is a superabundance of grass.*

The first lot of beasts is sent to market about the beginning of July, and after that a certain regular number is dispatched weekly to Smithfield, so that the entire stock is got rid of by the first week in November; except perhaps a very few that the fancy of the grazier may incline him to keep on in sheds for the Christmas market, and these receive 10, 12, and even 15 lbs. of cake per day, with as much hay as they choose to eat. The oxen during the summer, as they become fat, move in rotation from the inferior to the best pastures; the vacancies caused by their removal being filled up by sheep in the autumn.

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* All graziers contend that oxen and sheep cannot profitably be fed upon the land at the same time, from the butcher invariably finding that beasts "*prove*" so much better when fed without sheep; but nevertheless a reserve force of sheep is necessary, as there comes occasionally (what I have heard graziers term) such a *rush* of grass, that the oxen without the help of the sheep would be quite overpowered by it; and when it once becomes rank and begins to decay under their feet, they will sooner starve than touch it; and the field is ruined for the rest of the season.

Sheep-grazing.

Sheep are not bred upon some grazing farms, but are bought in as lambs from the beginning of September to the end of October; any more that are required are bought in in the spring of the year. The greater part are shorn and sold off as soon as fat in May, but some are kept round to another season and a second fleece obtained. The Leicester sheep with a slight cross of the Southdown is a breed now getting much into favour. A few of the two-year-old sheep are sometimes fed with oil-cake, at the rate of half a pound per day.

Arable portion of grazing farms.

Many of the grazing farmers have but a very small portion of ploughed land attached, which when heavy is farmed upon the four-course shift, viz.:—1, bare fallow; 2, barley; 3, seeds; 4, wheat; 5, bare fallow; 6, barley; 7, beans; 8, wheat.

The bare fallow receives three ploughings, the first of which is called "fallowing," the second "stirring." It is then manured and receives the last ploughing, which is termed "laying up for the winter." If the land is as clean as it should be, to be ploughed oftener and scarified (as is too frequently necessary) not only weakens the soil by constant exposure to the sun and air during the heat of summer, but, the land, being reduced to a very fine tilth, lies too compact to receive benefit from the frost in winter, or to become sufficiently dry to work in spring, when seed-time arrives.

Working expenses of a grazing farm.

The labourers employed upon a grazing farm, although comparatively few in number, generally receive higher wages than those in the arable districts. A farm of 700 acres of which about 100 only are arable will employ on an average 15 men and 5 boys. A grazier of my acquaintance pays his labourers, at the present time, as follows: shepherd, 12*s.* per week, with house and garden rent free; horse and cow-man combined, 11*s.* per week, with house and garden free; boys, 3*s*; and the rest of the men, 9*s.* per week each. These are liberal prices, and may be looked upon as being somewhat above the average of the locality.

NENE VALLEY.

The valley of the Nene comprises an extensive tract of about 10,000 acres of rich meadow-land, 50 miles in length, extending from a little above Northampton to Peterborough. It consists of a rich alluvial soil, with a subsoil made up of the accumulated debris of various other formations, comprising sand, gravel, loam, clay, &c. resting upon the blue lias below. The soil is very productive; but, unlike the rich pastures above described, which derive a large portion of their nutriment from the subsoil, this valley is principally fertilized by the periodical floods, which on their subsiding in the spring leave a fine alluvial deposit behind them.

Heavy floods however too often occur in summer, which not only spoil the quality of the long grass by the quantity of soil that is left behind, but even new-mown grass and haycocks are seen sometimes floating down the stream; and the same contending interests, that is, the farmer's and the miller's—who more than 200 years ago disputed each other's right to control the waters of the Nene*, are still not satisfactorily adjusted, and, as might be expected, the end of neither party is properly served; the farmer preventing the miller from keeping up such a head of water as the latter considers necessary to balance his supply in summer, and the miller on his part generally contriving to maintain the water high enough to place the farmer's crops of hay in great jeopardy, and often cause him serious losses.

Drainage of Nene Valley.

Two or three years since a magnificent scheme was started, which however most practical men are illnatured enough to style "wild goose;" in which it was proposed by deepening the outfall and bed of the river, and also by a series of embankments along its banks, to effect a complete drainage of the valley of the Nene. With that view surveys were made and engineers consulted, but their estimates of the sum required to effect the object were so enormous that the expense, if defrayed only by those lands most liable to flood, threatened to come to something like 20*l.* per acre; and it would be evidently unjust for the proprietors of those lands which perhaps are not injured by floods above once in 10 or 20 years to be compelled by Act of Parliament to contribute their money to a scheme from which they would be likely to derive so little benefit.

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* In the 9th year of Charles I. (1633) the damage to the lands by the side of the Nene had from various causes grown so excessive that a commission of sewers sat at Kettering to inquire into the best mode of redressing the different abuses then existing.

In several cases a great deal has been effected in the way of drainage by adjoining proprietors uniting together, and making a large open cut or drain, perhaps upwards of a mile in length, into the nearest mill-tail, thus obtaining an excellent outfall for the water lower down the river, after which the land has been thoroughly under-drained. An immense deal more might be done in a similar way, by unity of action amongst owners and occupiers and a little money judiciously laid out.

It sometimes happens that a meadow is so entirely surrounded by the water of the river, mill-streams or back-brooks, that it becomes necessary in order to obtain an outfall for the drainage water to carry a drain below the bed of the river; and a wooden pipe or culvert has been constructed for that purpose in more than one place that has come under my notice.

Syphon pipes recommended.

Where such drains are required, I should much recommend the use of cast-iron syphon pipes, in preference to anything else; a considerable amount of excavation might thus be saved, they would be much more expeditiously laid in, less liable to get out of order, and much more durable than wooden boxes.

The hay crop.

The meadows adjacent to the Nene are held by a great number of farmers, who, for the most part, occupy a considerable extent of arable land on the adjacent uplands, and some even at considerable distances. They rely almost entirely on the meadows for their supply of hay, and the crop is usually most abundant, yielding two tons and a half to three tons per acre, and of first-rate quality. All the most approved haymaking machines and horse-rakes are in use, and great care is taken in getting in the crop, the perfection of the art consisting in the precise amount of sun and wind that it ought to get, to preserve a fine, fresh, green appearance without the risk of its heating too much by being carried too soon; and I know a very good farmer who (regardless of the gibes of his neighbours, joined with many facetious inquiries as to whether he had lost his watch, &c.) not unfrequently turns over and re-erects his stack upon a fresh site, after it has been up a few days, if he suspects too much heat, and considers that he gets a better and more nutritious quality of hay, by so doing, than if he turned it once too often in the field, and asserts that there is no great difference in the expense of turning in the field or turning on the stack. The system of cutting flues or chimneys through the stacks to prevent fire, when too much heat exists, as practised in some counties, is decidedly bad, as a great portion of the hay adjacent to the chimneys is certain to turn mouldy. All farmers with whom I have conversed on the subject fully appreciate the great advantage conferred by the floods in winter, and affirm that they would sooner run the risk of an occasional summer-flood than lose the fertilising deposit left by the water in winter.

Aftermath. After the hay is secured and the grass has been allowed to get to some head, the meadows are heavily stocked with sheep and oxen till Michaelmas, and in very favourable seasons, when the weather remains dry and open (as the present has been),* they afford a good bite for cattle till the end of November; but as a general rule, owing to the winter-floods, the farmer derives no benefit from them for four or five months out of the twelve.

Valley of the Welland. Another valuable tract of meadow land lies along the valley of the Welland, which river divides this county from Rutland. This district is even more liable to flood than the Nene Valley, a few hours' rain being sufficient to lay a large extent of country under water. It might, however, to a considerable extent, be easily remedied by a little clearing-out and enlarging the bed of the river, which in many places, from neglect, has become a comparative ditch, not having been scoured in any way for many years.

Water-meadows. Very little advantage has been taken of the facilities which the numerous streams of this county afford for irrigation, and the construction of "water-meadows." Mr. Augustus Stafford has, however, carried out the system most successfully at Blatherwycke, and there are also some meadows of the same kind at Barton Segrave, near Kettering.

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* 1851.

Dairying and cheese-making.

Cheese-making may be looked upon merely as constituting part of the working expenses of a farm in this county, the quantity made being sufficient only for the supply or partial supply of the household.

Butter, moreover, is by no means a staple production of the county, the best pastures being always reserved for fatting; the milch cows being kept on the fields of medium quality. A dairy of eight or ten cows is looked upon as large, three or four being more like the general rule, a portion of the milk of which will be devoted to the rearing of calves.

FARM BUILDINGS.

Loss of manure.

If we take as our model and guide, as to what farm buildings ought to be, the admirable plans that have been drawn and essays written and published in the Royal Agricultural Society's Journal on the subject, and then look at the ordinary steading of a Northamptonshire farm, we shall see there, I fear, much more to eschew than to imitate. How is it, a novice would exclaim on entering one of our villages, that the grass and weeds grow so luxuriantly and look so fresh and green, and the elms so fine and vigorous, upon the margins of the ditches which skirt the highways? They are all the indubitable offspring of that dark-coloured stream that flows down, whose source is in the adjacent farm-yard: nothing less than the essence of the manure, and life-blood of the farm, washed away (by the drippings from the unspouted eaves of the numerous buildings) from the dung, for the retention of the moisture of which no proper receptacle has been made. How anxious we all are to prosecute the youngster who steals our turnips or filches our eggs, and yet we go on from year to year quietly submitting to a robber whose depredations extend over every acre of our occupations. I know an instance of some strong blue gault (Oxford clay) thrown out from the bottom of a ditch, into which the liquid from a farm-yard had run for some time (the farmer himself declining to make use of it), being taken possession of by a more intelligent neighbour; and, although this material, when taken alone, is noted for unproductiveness, especially when applied to cold, strong land, as was the case in this instance, yet, notwithstanding, the ground upon which this was laid, without any other kind of dressing, produced an extraordinary crop of beans, followed by an equally good one of wheat; and the beneficial effects to all crops were apparent for four years after the clay was applied![*]

Homesteads badly situated.

Owing to the long, straggling form of the generality of farms in this county, occasioned by the huddling together of the homesteads in the villages, we can never expect to realise those complete establishments, so ingeniously laid down by rule and pen, lying in the very centre of a compact 400 acres; still we may gather many valuable hints from them, and do a great deal towards improvement.

Advantage of a scattered establishment.

Our only resource, and a very good one too, is in field-barns, which have been pretty generally erected since Mr. Pitt's Report was written, although many more are still wanted. They generally consist of a capacious barn, shed, and perhaps a labourer's cottage; and now that portable farm steam-engines are brought to such perfection, with every prospect of superseding stationary ones for thrashing corn, &c., I am of opinion that in some cases upon large farms a field-barn or two, with cattle-sheds attached, is more advantageous than one large establishment, inasmuch as the corn is stacked and thrashed out almost on the spot where it is grown, and by keeping sufficient stock at each place a dunghill is formed,

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To prevent waste of manure.

[*] The power of clay to absorb and retain the most fertilising properties of manures fully accounts for these results, and it shews that, by a little contrivance, a person might, without the advantage of a liquid manure tank, be able to retain a good deal of the manure now lost, by forming a channel or trench to receive the superfluous moisture which flows from his dung depôt; and, this trench being loosely filled with soil or clay, the liquid will trickle slowly through it, and (as demonstrated by the interesting experiments lately conducted by Professor Way) leave in combination with the clay the ammonia and other salts so indispensable for producing abundant crops; and when this soil becomes thoroughly impregnated, it should be carted at once upon the land, and the trench filled with a fresh supply.

one may almost say, at the corner of every field, saving an immense expense in carting. The field-barns which have been erected at various times are generally substantial buildings, much better constructed than those at the homesteads, and have tiled or slated roofs.

Evils of Thatch.

The most glaring faults in most homesteads are, that some or all of the buildings are roofed with thatch. Besides harbouring the vermin and consuming the straw which might be converted into manure with so much greater advantage, it is almost impracticable to apply spouting to thatched buildings, on account of the eaves so soon becoming uneven and ragged, which causes the water to drip short of the spouts, whilst the decayed straw and rubbish from the roof would be very apt to block up the vertical pipes and cause the water to lodge in them, and, should such be the case, and a frost follow, they would, if made of cast iron, presently burst. Buildings thatched with reeds may, however, have rain-water troughs attached to them with advantage. Another evil of thatched buildings is that they have for the most low eaves, and high-pitched roofs, giving the largest breadth of roof to keep in repair, combined with the smallest cubical contents within.

Inconvenient arrangement.

The position and arrangement of farm-buildings are frequently as fantastic as their shapes, a large barn often being placed as far from the stackyard as possible, and no access to it when a corn-stack has to be taken in, except through the straw-yard full of cattle and pigs, and perhaps knee-deep with dung and mire.

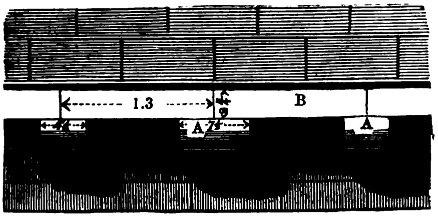
Suggestions for gradual reform.

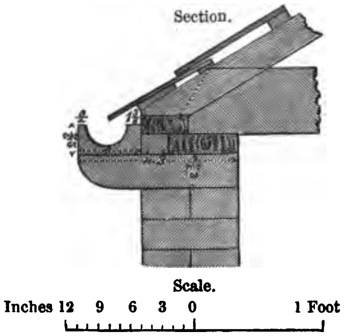
I shall confine myself to suggesting such improvements as can from time to time be supplied to all premises, however bad and ill-arranged they may originally have been. As the thatched roofs fall into decay, slate or tile should be substituted, with the addition of rain-water pipes (which latter at present are not to be seen upon one farm homestead in 300). This would not only preserve the foundations of the buildings, but if the water from the roofs was collected together in a well or under-ground tank constructed of brick set in cement, it would afford an ample supply of soft water for washing, brewing, and all culinary purposes, to a large family; not to mention what was before noticed, the advantage to the farmer and the permanent improvement to the land by the increased preservation, from year to year, of the soluble particles of the manure, which used previously to be conveyed away from their rightful owner.

Brick water-troughs.

A description of water-trough invented by that energetic agriculturist Lord St. John, and applied by him to all his numerous new homesteads in Bedfordshire, is worthy of notice.

ELEVATION.





The corbels or brackets (A) which support the water-trough are built into the wall at distances of 15 inches asunder, measured from centre to centre. The water-trough (B) is shaped like a small-sized draining brick inverted, and can be made at any brick-yard with all tile-making machines. The troughs joint over the centre of each corbel, and are set in and jointed together with Roman cement.

This description of water-pipe makes a neat finish to a roof, and is in fact quite a set-off to the appearance of a building; besides the great recommendation of being remarkably cheap, costing three farthings per lineal foot, less than a fifth the cost of iron spouting; it can only, however, be conveniently applied to new buildings, or to an old brick or stone building that is being new roofed.

After the water from the eaves has been provided for, the yards where dung is allowed to accumulate should be laid into a dished form, so as to confine the liquid as well as the solid portion of the manure, and what runs over after that should be conveyed by a drain to a liquid manure tank. These remarks may appear superfluous to those who have been for some time in the habit of properly economising their manure; but when, taking the county through, I see how little attention and care is taken in the accumulation and preservation of this important material, it seems incumbent upon one to make a few observations about it.

Shed accommodation.

Additional shed accommodation for store or feeding stock is a thing greatly needed upon the majority of our farms; and, however rough the architecture might be, it would be a great boon to the farmer, who being thus encouraged to keep more stock, a permanent benefit to the farm must follow, and consequently to the landlord's pocket.

DRAINING.

Extent of natural drainage.

A considerable breadth of this county requires no underdraining; this includes almost the whole of the red land, with its substratum of loose rock, also frequent fields of thin staple upon the great oolite or limestone, where no bed of marle, loam, or clay intervenes. Nearly the whole of the parishes of Easton and Collyweston are of this latter description, and are called locally "creach land."

Varieties and extent of artificial draining.

Of the remaining portion of the county, nine-tenths I should say have been drained during the last 30 years, and some portions two or three times over. Stone, being in most places a plentiful commodity, has been much used for the purposes of draining arable land, the drains being usually cut 18 inches to two feet deep, and filled with broken stone to the height of seven or eight inches.

Turf-draining has been much practised upon pasture-land; whilst in other parts wood and straw have been the only material used in filling drains. Although occasionally drains of the above descriptions may last 20 years, it generally happens that they are worn out and cease to act at the end of 10 years; consequently there must be a great breadth of land in the county the drains of which require renewing yearly; and when conversing with farmers in various parts of the county on the subject of draining, their answer to my inquiries has very generally been, "All my farm was drained about 10 or 14 years ago, but most of the drains are now worn out and require renewing." And their opinion of the whole lordship in which they reside is, with few exceptions, the same.

Tile-draining.

The practice of thorough draining with pipes or tiles, laid in at much greater depths than formerly (but varying according to the character of the subsoil), which the science of late years, confirmed by experience, has shown to be the only effectual way of making a lasting improvement to the land, has fairly set in in this county during the last five years. As I said before, most properties have been drained at various periods, of from 10 to 30 years since, with broken stone, brushwood, or by wedge-draining; and, as a portion of these become worn out and useless every year, the tenants are now in most instances supplied with tiles by the landlord, which they usually lay in at their own expence, besides carting the materials.

Private tile-yards.

The reduced price of coal has enabled brickmakers to supply tiles at very low rates; besides which, several proprietors have opened tile-yards of their own within the last few years, for the supply of their tenants. The Marquess of Northampton, Lord Henley, Sir Charles Knightley, and Lord Pomfret, have, amongst others, effected that desirable object. If, however, I should be asked to hazard an opinion on the subject, I should say, at a rough guess, that scarcely one-twentieth part of the county on which draining is required has been thoroughly drained with tiles at present; still, however, the progress making is sufficient to employ most of the labourers who would otherwise be idle, at the same time without inconveniently raising the price of labour. The Marquess of Northampton's agent informed me, that he believes, notwithstanding the depressed state of agriculture, that all the tiles which were made last year at his lordship's yard will be fetched away by the tenants, amounting to 600,000. Also at my own tile-yard, established last year in a locality where tiles had previously been scarcely used for draining, after reserving a portion for my own use, I have found a ready sale for the remainder. I mention these facts to show that, at any rate in this important branch of agriculture, a great spirit for improvement exists.

A few in this county have, by timely application, succeeded in obtaining sums of money from the Government Draining Loan, and I am glad to find that the Government inspectors interfere very little in the method of carrying out the drainage, when they find they have intelligent people to deal with; at least, such is the case upon the property of the Rev. Thomas Scott, at Wappingham, where the drainage is being very ably conducted by Mr. Newitt, his tenant. The subsoil upon this farm is very variable, and the drains are put in at depths of four and five feet; the former 30 feet, the latter 60 feet apart. Pipes are used of one and a half inch bore, and one foot long; the ends are confined by collars, three inches long, which prevents the possibility of a pipe getting out of position; 2*s*. 8*d*. per chain is paid to the men for making the four-feet drains, and 3*s*. 6*d*. for the five-feet drains; this includes unloading the tiles, cutting the drain, laying the pipes, and filling up again. The tiles have to be be carted four miles, and cost at the yard 17*s*. per thousand, which is not particularly reasonable, and the collars 5*s*. per thousand.

CATTLE.

Horses. Our cart-horses are more noted for great strength and hardy constitutions than for speed; they are of a variety of colours, but dark brown and black are the most prevalent, and also most approved of; they are frequently very coarse in the breed, and have a profusion of shaggy hair about the feet and head. A horse of quicker action and cleaner in the leg is, however, obtained by crossing the ordinary cart-horse with the Suffolk, which is not unfrequently done now, and the result is an animal better suited for the lighter implements, the more perfectly drained land, and improved roads, of the present day.

Short-horned cattle.

Northamptonshire has of late years become noted for its breed of short-horned cattle, and to none is the county more indebted than to the late and present Earl Spencer, for the perfection to which the breed has been brought, through the careful attention bestowed upon it at their farming establishments for upwards of 30 years. Amongst others also who have bred the "Improved Durham Short-horns" extensively, may be named, the late Marquess of Northampton; W. B. Stopford, Esq., of Drayton Hall; Augustus Stafford, Esq. M.P., of Blatherwycke; Thos. Tryon, Esq., of Bulwick; Mr. Beasley, of Overstone Lodge; and Mr. Leete, of Slipton. This breed of cattle, besides the merits of weight and quality, as before mentioned, has also the advantage of attaining an early maturity; and these combined qualifications have caused them quite to supersede the long-horns, which were formerly the breed of the county.

Sheep.

The Leicester is the leading sheep of the county, and *its* blood is found in all the other breeds that are kept.

In the neighbourhood of Northampton, the "half-breds" (Leicester and Southdown) are prevalent, the meat being preferred by the butcher and consumer; consequently, a more ready sale and better price is obtained for it in a good market like Northampton. Towards Oxfordshire, on the western extremity of the county, the Leicester is crossed by the Cotswold or Gloucester. The result is a large variety, which attains to considerable weights when fat, but requires good land to bring them to perfection. In the Fens, and along the borders of Lincolnshire and Rutland, the "improved Lincolns" (being the Lincoln breed crossed by the Leicester) are kept—a large kind, remarkable for the length and weight of their wool (which, however, is somewhat coarse in quality), two fleeces of lamb-hogs generally going to the tod; but the meat is of coarse quality, and on account of the great weight of wool this breed thrives only with high feeding, or upon very good land.

Pigs.

The best breed of pigs is found in the north-eastern part of the county, upon the borders of Rutland and Lincoln. Their colour is white, with great length and depth of carcass, without being over long in the legs, and they feed up to 50 stones. Some farmers think it a profitable and economical system to take one litter of pigs from the sows before spaying them, which is done at the same time with their pigs, there being no danger from inflammation following, if performed whilst the pigs are sucking; the sow having now come to her full growth, feeds quickly for the butcher, and will not weigh less than 40 stones when fat. Boiling the food for pigs and cattle is practised by few, but those who have tried it speak well of the result. Store pigs may be kept in good condition upon boiled turnips, barley, &c., for 2*s.* 6*d.* per week.

MANURES.

Lime.

Artificial manures, as a general rule, are not much used in the county. Lime is found beneficial upon every variety of soil; and, as might be imagined from the great abundance of limestone-rock in the county, the use of it has been very considerable, but seems to have fallen off lately, which is to be regretted, more particularly when the reduced price of coal is considered.

Lime, cost of manufacture.

Many farms have lime-kilns upon them; and to burn a kiln which contains 53 quarters of eight bushels usually costs for labour only 25*s.*; this includes quarrying the stone, breaking, setting, and drawing. Fifty hundredweight of coal is required to burn it, which may now be obtained at the railway stations for 12*s.* 6*d.* per ton, by taking a truck of five tons.

	£	*s.*	*d.*	
Labour . . .	1	5	0	
* Coals, allowing for carting six miles; 50 cwt. at 10*d.*	2	1	8	
	£3	6	8	Total cost of 53 qrs., or not quite 1*s.* 3*d.* per quarter.

20 to 30 quarters is the usual quantity applied per acre, and the land will not require another dressing for 10 years. As

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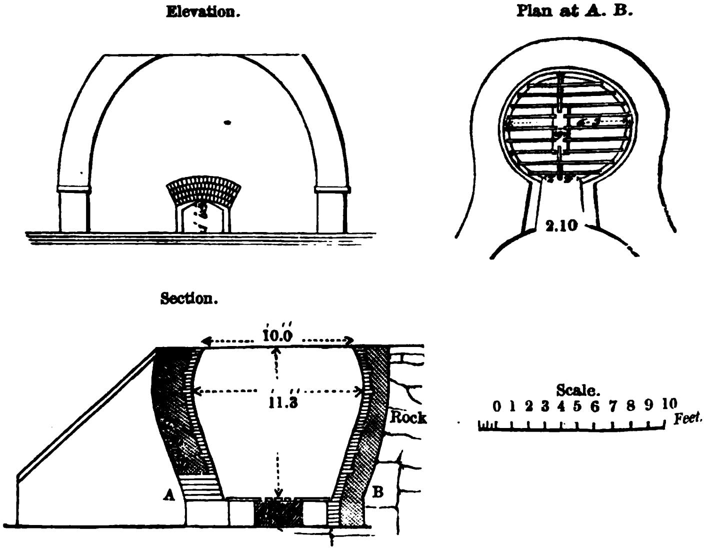
* The Hawksbury coal from near Coventry can now be delivered at Higham Ferrers Station for 11*s.* per ton (1852).

2*s.* 9*d.* per quarter is the lowest price charged for lime at sale-yards, a saving of 1*s.* 6*d.* per quarter or 1*l.* 17*s.* 6*d.* per acre is effected by having a private kiln, not to mention the additional expense of carting several miles.

Lime-kilns are usually placed in the quarry where the stone is procured, the face of the rock affording a good support to the back and side walls, which may be more or less thin, according to the sound state of the rock; the front is supported by wing-walls. As there is more skill than might be supposed required in the construction of a good kiln, I annex a sketch of one, showing the form which has been found to succeed the best. The main features of it are, a considerable breadth of opening at bottom for the admission of air, and a top somewhat contracted for the better retention of heat. A great waste of fuel is incurred by the almost bell-mouthed form of many kilns. The best kilns are lined with four-and-a-half-inch brickwork, as the stone unprotected would soon become calcined by the fire. The erection of a kiln large enough to burn 60 or 70 quarters of lime costs 10*l.* including bricks for the lining and entrance.



To quarry the stone for the remainder, would cost about two pounds more. The bars are moveable for convenience of drawing the lime, merely resting upon the brick pier in the centre.

Salt.

Manure-salt is sometimes applied to arable land at the rate of from 14 to 20 hundredweight per acre, but it is only beneficial upon light land, its effect being to moisten and cool the soil: its beneficial effects are not felt, however, after two years.

Rags.

Woollen rags have been used as manure for many years in this county, and are particularly beneficial upon light soils that are liable to burn up in dry weather. The following result of some experiments made by Mr. Robert Wiggins of Orton Lodge, near Kettering, upon a variety of artificial manures, may not be uninstructive. The manures were applied upon plots of ground of 20 poles each, after which Swede turnips were taken, followed by a crop of barley: the whole of the root crop was drawn and taken off the ground, and no additional manure applied for the barley.

Manures.	Quantity used per Acre.	Price per Acre.		Weight of Turnip Crop.				Yield of Barley Crop.				Remarks.
		£	s.	Tons.	cwt.	qrs.	lbs.	qrs.	bus.	pks.	galls.	
Woollen rags .	8 cwt.	1	10	17	16	0	0	5	1	0	0	
Gelatine . . .	5 cwt.	1	10	16	8	0	8	4	5	0	0	
Bone manure .	12 bus.	1	10	17	13	1	4	4	7	0	0	The bones had been previously dissolved and manufactured, about 6 bus. of the 12 being really bones.
Guano . . .	3 cwt.	1	10	18	15	0	24	4	5	0	2	
Nitrate of soda .	2 cwt. 18 lbs.	1	10	18	16	3	4	4	6	2	0	
Superphosphate of lime	. .	1	10	14	18	1	4	4	2	2	0	
Nothing . . .	. .	.	.	12	12	2	10	4	2	0	0	
Farm yard manure	20 loads per acre	.	.	17	8	2	8	6	0	0	0	Two-thirds of the turnips were consumed by sheep on this plot.

The whole produce of each plot was weighed the second week in November, 1849, and the crop of barley was taken in 1850.

The experiments were made on light red land, not very deep in staple, upon a kealy bottom, and had not been manured for the previous four years.

Disafforestation.

The woods and forests, which were formerly very extensive are now considerably reduced, gradually yielding up the domi-

nion of the soil before the steady march of cultivation. 250 acres were grubbed upon the Marquess of Exeter's property last season, and I understand that it is in contemplation to clear a similar space this year. The Earl of Cardigan has also cleared and brought into cultivation between 700 and 800 acres during the last six or seven years. The Earl of Westmorland and Sir A. De Capell Brooke, also, have not been idle in the neighbourhood of Rockingham forest, nor indeed was the late Marquess of Northampton upon the opposite side of the county. These works, besides being a great boon to the working public, must doubtless prove a source of increased wealth and revenue to the proprietors.

Rents in this county range from 18*s.* per acre on the poor clays to 50*s.* on the best red soils: this is exclusive of land or garden-ground adjacent to Northampton and other towns, which sometimes lets as high as 6*l.* or 7*l.* per acre.

Wages.

Agricultural labourers are better paid here than in some other counties; no able-bodied man gets, even now, less than 8*s.* per week, and the best hands, who do contract-work, usually earn 9*s.* to 12*s.* per week. That the present flourishing state of the shoe trade, which is the chief manufacture of the county, tends to keep up the price of agricultural labour, is evident from the great number of youths who, tempted by better wages, desert the land for the Last.

The usual rent for a labourer's cottage is about 2*l.* 10*s.* per annum.

III.—Improvements that have taken place within the last Fifty Years.

Railways.

Not sufficiently availed of, and why.

The advantages so recently conferred upon agriculture by the introduction of railways is too well known to require much comment; there is still, however, great room for improvement in those extensive concerns, in order that the farmer may derive his full benefit from them. The erection of goods-sheds and increased siding accommodation at many of the minor stations is much required. Many of the graziers in this county

still persist in driving large quantities of fat cattle to London, at an increased expense to themselves of 2*s.* 6*d.* per head, their excuse for this practice being want of punctuality in the railway companies and detentions on the road, which have sometimes occasioned serious losses, by the cattle not being in time for certain markets, and this has induced many to prefer the slow but sure way of walking up the cattle. But every year will work a great improvement in these matters: the opening of competing lines, by relieving some railways of their superfluous traffic, and promoting emulation in others, will be of great advantage to the public, and make railway managers as anxious to keep in the good graces of the farmer as they have hitherto been to meet the wishes of the more vigilant and clamorous merchant and manufacturer. Those whose farms lie near to a railway station are of course the most benefited, and many farmers who had formerly six or seven miles to drive their corn now deliver it into the hands of some Birmingham or other dealer at the adjacent railway station, without even the loss of half a day's work to the horses.

Public road improvements.

The improvement which has taken place during the last half century in parish roads is scarcely less remarkable or advantageous than the establishment of the railway system. Forty-five years ago, in the parish where I reside, there was no metal upon the roads; and, the subsoil being a strong clay, waggons in the winter time frequently sank in to the axles, and are said, without using much romance, to have frequently "run upon the hubbs" (or naves of the wheels) as well as the tire. A load of corn for market had to be carted three miles, in two moieties, to get upon a hard turnpike road, and there be reloaded, the nearest accessible market in those days being thirteen miles distant, and two tolls to pay. Our corn-market is now seven miles off, over parish roads, and consequently without a toll. Taking the county through, the parish roads are certainly much better now than the turnpike were forty years ago.

Material.

We have not the advantage, however, of first-rate materials for mending them. Limestone, which is the substance generally used, being usually too soft, shortly grinds into a white

nion of the soil before the steady march of cultivation. 250 acres were grubbed upon the Marquess of Exeter's property last season, and I understand that it is in contemplation to clear a similar space this year. The Earl of Cardigan has also cleared and brought into cultivation between 700 and 800 acres during the last six or seven years. The Earl of Westmorland and Sir A. De Capell Brooke, also, have not been idle in the neighbourhood of Rockingham forest, nor indeed was the late Marquess of Northampton upon the opposite side of the county. These works, besides being a great boon to the working public, must doubtless prove a source of increased wealth and revenue to the proprietors.

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Rents in this county range from 18*s.* per acre on the poor clays to 50*s.* on the best red soils: this is exclusive of land or garden-ground adjacent to Northampton and other towns, which sometimes lets as high as 6*l.* or 7*l.* per acre.

Wages.

Agricultural labourers are better paid here than in some other counties; no able-bodied man gets, even now, less than 8*s.* per week, and the best hands, who do contract-work, usually earn 9*s.* to 12*s.* per week. That the present flourishing state of the shoe trade, which is the chief manufacture of the county, tends to keep up the price of agricultural labour, is evident from the great number of youths who, tempted by better wages, desert the land for the Last.

The usual rent for a labourer's cottage is about 2*l.* 10*s.* per annum.

III.—Improvements that have taken place within the last Fifty Years.

Railways.

Not sufficiently availed of, and why.

The advantages so recently conferred upon agriculture by the introduction of railways is too well known to require much comment; there is still, however, great room for improvement in those extensive concerns, in order that the farmer may derive his full benefit from them. The erection of goods-sheds and increased siding accommodation at many of the minor stations is much required. Many of the graziers in this county

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mortar, which again is converted into dust in the summer. The blue description, which is generally obtained from the bottom strata in the quarries, makes, however, a harder and more durable road-metal. The Mount Sorrell stone (so called from the place in Leicestershire where it is obtained) makes a hard and superior road-metal, and is imported by canal into this county, and used to some extent for roads.

Inclosures. The general inclosure of all the remaining open-field parishes and waste grounds forms a most important item in the improvements that have been effected during the last 50 years.

IMPLEMENTS.

Thrashing machines. The thrashing machine, which was not known in this county at the time that Mr. Pitt wrote his Report, is now universally used for thrashing wheat, but not so generally for barley, an erroneous idea being prevalent amongst maltsters that barley is damaged by being thrashed by machine, through the ends of the grain being bruised or chipped off in such a manner as to interfere with its shooting; if the machine be of good construction, and the adjustment attended to according to the state of the corn at the time of thrashing—requiring, as it does, to be set wider when the corn is very dry and brittle, than it does when damp and tough—no harm can possibly be done to the grain. This is proved by the maltsters themselves, who, when they ask the usual question, Was it thrashed by hand? on being told to examine the corn and judge for themselves, are compelled to admit that they cannot tell. A fallacy like this cannot be too soon exploded, that the farmer may be enabled to add a trifle to his already reduced profits, in the difference of expense between hand and machine thrashing.

Drills. Drills, few of which had been introduced in the time of Pitt, are now in general use, in all their shapes and improvements.

Ploughs, &c. A great revolution is taking place in ploughs, which has set in principally during the last four or five years. All the improved tools manufactured by Ransom, Howard, Keeble, Ball, &c. being purchased with avidity; and, although many old-fashioned farmers still assert that the old wooden swing-plough is the easiest drawn through the land, I think auction sales are a better means of judging of the real opinion of the public, and whilst a "Woodford plough" (which is the name given to the ploughs that were generally used in the eastern division of the county) with difficulty obtains a customer at 5*s.* I have seen an iron plough of Ransom's obtain a price, after two or three years' service, above what new ones can now be obtained for at the manufactory; and the competition for a set of William's patent harrows is perfectly amusing; whilst an old wooden set does not realise the price of old iron for the teeth.

On nearly all the light lands the ploughs are drawn by two horses abreast without a driver, but on the heavy soils three horses at length, and more frequently four, are deemed necessary.

The double furrow ploughs are still used in a few solitary instances; upon light red land, they are drawn by four or five horses at length, and turn over two acres in the day, but as a couple of two-horse ploughs will execute the same work in a neater manner, and save the expense of a driver, the double furrow plough will very soon die a natural death.

Conversion of heath-land into tillage.

In no part of the county has the progress of agriculture been greater and the success more decided than in the parishes of Easton and Collyweston, which were in open-field state when Pitt published his Report, and, in fact, for many years afterwards.

The Heath Farm, in the parish of Easton, occupied by Mr. Dainty, may be taken as a good specimen of what has been done. The surface-soil is of a very thin, weak character, upon a substratum of limestone; the soil is not sandy, but in dry weather becomes like dust, and is carried along by the wind; and the substratum is a loose rubble: the local appellation is "creach land."

When Mr. Dainty came to this farm, about twenty years ago, a considerable portion of it was heath-land, producing nothing but furze, fern, and a scanty supply of the coarsest herbage; the remainder had been cultivated for grain, but produced the poorest of crops, and no turnips were grown. It now produces most excellent crops of white turnips, and five quarters of wheat of medium quality to the acre.

Mr. Dainty came determined that all that enterprise and spirit could command should be done for the land. He worked, however, for some years with the greatest industry, without any commensurate success, and was upon the point of throwing up his farm in despair, when the use of bone manure first attracted his attention; he tried it, and succeeded.

The heath-land was first pared and burnt, and then brought round by the copious use of bone manure, which was applied at the rate of 10 bushels to the acre, and crops of white turnips taken every second year, followed by wheat and barley alternately. The great advantage of turnips so frequently, being, that something approaching consistence might be imparted to the land by the constant treading of the sheep, it being a great point with this soil, that every turnip should be eaten off on the land by sheep; and where the experiment has been tried of drawing one portion of a field, and feeding off another, the barley-crop after the turnips which were drawn, although manured for, bore no comparison to that upon the part fed off. Mr. Dainty having completely brought "the ball to his foot" (as one of his neighbours remarked to me) by this alternate system of turniping, has since adopted the five-course practice: viz. turnips, barley, seeds two years, and wheat. Swedes are scarcely grown in the parish, being considered too trying a crop for land whose staple is naturally so thin and weak. Many farms at Easton and Collyweston, besides maintaining a sheep to the acre regularly, take in large flocks from the fens to help to consume the turnips in the winter.

These lands, from their requiring no draining, and the cheapness with which they are worked, two ponies being able to draw a plough, perhaps pay as well in these times as any other description of soil. The game, however, makes considerable ravages upon those farms that are adjacent to the woods; but, as the farmer enters upon the land with the full knowledge of this fact, and the Marquess of Exeter can afford to give them the land at "hare rent," no one has a right, perhaps, to complain.

Game.

Increased fertility of county.

That the productive powers of the county generally have been greatly increased since Mr. Pitt reported on the subject is evident from the fact that he considers four quarters per acre of wheat the outside yield upon rich, red soils, and five quarters the produce of barley; whereas our best farmers now after an average season regard nothing below five quarters of wheat as a good crop, and six or seven are even occasionally taken on the best red land, and six quarters of barley are expected after a fallow. And if we make allowance for the difference between the old Winchester bushel and the present imperial measure, the difference is still greater in favour of the present produce to the extent of one bushel in four quarters. I fear, however, that still, upon much of our cold, clay land, the wheat crop frequently falls below three quarters to the acre.

Overstone Lodge.

I must not conclude the chapter of improvements without noticing the Lodge Farm at Overstone, the property of L. Loyd, Esq. and occupied by Mr. John Beasley. This farm contains between 700 and 800 acres, and, from its being the only farm in the county furnished with a stationary steam-engine, besides other advantages necessary for the most advantageous occupation of a farm, it may perhaps claim to be considered the model establishment of the county. The parish of Overstone, which was inclosed upwards of a hundred years ago, and from the overgrowth of timber and smallness of the fields possessed a very forest-like appearance, has regardless of expense (so far as this farm is concerned) been entirely re-inclosed, the old crooked fences and a great deal of the superfluous timber have been swept away, and even the public roads have been straightened, and the land laid out in large inclosures proportioned to the size of the farm. The land is all suitable for the growth of turnips, easy to cultivate, and very productive, consisting principally of a light, red loam. The farm maintains about a thousand long-woolled sheep, and in the farm yard, which is well furnished with shed and other accommodation, may be seen during the winter about 160 head of cattle (Durham shorthorns), upwards of forty of which are feeding for the butcher, and the rest in every stage, from calves upwards, including two thorough-bred bulls. One-horse carts are used upon the farm, and every facility is provided for accumulating a large bulk of manure.

Too many farmers are apt to look at establishments like the above in the light of an expensive game at farming, which none but the millionaire can afford to play at; but if they were to examine a little closer into the matter, they would find that points of economy are attended to, and savings effected in many items, which they at their more humble homesteads think too trifling to notice. And I strongly recommend any one not to throw away an opportunity of visiting Overstone Lodge, where a considerable amount of talent as well as money has been put in requisition, for the successful carrying out of the concern, and I think that few will leave it without owning to the acquisition of an additional wrinkle or two.

Agricultural Societies.

There are five local agricultural societies in Northamptonshire, viz. the Northampton and Kettering combined; the Wellingborough, the Thrapston, the Peterborough, and the Stamford; besides one at Banbury in Oxfordshire, which takes in the south-western extremity of this county.

These societies are constituted similarly to most associations of like character, and have exhibitions of cattle and implements, besides awarding prizes to the best ploughmen, drainers, and most deserving labourers, &c.

IMPROVEMENTS STILL REQUIRED IN THE COUNTY.

Two divisions of the subject.

This subject naturally falls into two divisions, namely, landlords' and tenants' improvements.

Tenure.

The two heavy items of farm buildings and draining have already been considered; after which nothing would in my opinion so materially improve the land and increase its annual value, and at the same time tend to raise the social position of the farmer, so much as the universal granting of leases. Many landlords will say immediately, "Why! I offered some of my tenants leases, and they declined to accept them." Now this says a great deal for the landlord, proving the perfect confidence the tenant has in him, inasmuch as he is willing, nay anxious, to trust his entire fortune as it were in his hands; but it says very little for the enterprise of the tenant. Any man who refuses a lease is not imbued with that spirit of improvement which marks the present era, and is unequal to the age in which he lives.

Leases general in Scotland.

The great renown of the Scotch farmer, and the high rents that the land carries in that country, is in a great measure to be attributed to the universal practice of granting 19 years' leases: many farms that I could name in Scotland, upon which neither wheat nor barley are grown or can be grown, and which yet are rented at 30*s.* per acre, speak volumes in favour of this assertion.

Leases are only granted in a few solitary instances in this county, and then for terms of 21 years, determinable however at periods of seven or fourteen years, which amounts to nothing (and, taking into account the attendant expenses of drawing up a lease, is worse than nothing), inasmuch as some unlooked-for change in the proprietary or trivial dispute may arise, and swamp the tenant in the very outset of his improvements; for even the thorough eradication of a single weed, the charlock, frequently occupies seven years; consequently it is only after that time that the farmer can reap the full benefit of his industry and perseverance in this item alone.

Beneficial consequences of leases.

On the other hand, let us suppose that a man has taken a farm on a 19 or 21 years' lease, not determinable at any intermediate period. The land has been recently drained and the homestead put into tenantable repair for him by the landlord; but the land is overrun with a variety of weeds. If he is an industrious man he will instantly set about to exterminate every tribe of them, in order that he may have the benefit of the full and undivided powers of the soil for as long a period of his lease as possible. And at the end of seven years he gets perfect mastery of the land and the weeds: he then sees how easy it is by a constant series of petty attacks to keep the enemy in his power, and finds that, although he must not relax in his vigilance, that the actual labour and cost decreases yearly, and that the cleaner the land is the cheaper it is to work and the better the crops are; and thus he goes on to the end of his term. If, moreover, he is a man of enterprise and capital, as he ought to be, he will not be contented with the natural produce of the soil, but will, by the application of clay to the light, burning soils, once during the period of his lease, and by a dressing of lime or burnt ashes upon the heavy section, twice during the term, impart a healthy tone and activity to the soil, which will be further increased by the judicious introduction of such artificial manures as science points out, and experience proves, to be most beneficial to the particular soils he may have to deal with.

Who can deny but that a farm carried on in this way for a space of twenty years will have received a lasting improvement, and will probably fetch twenty-five per cent. more rent when it again comes into the market, so that the landlord will eventually reap no inconsiderable advantage from this change in the system of tenure.

In my opinion it would be as reasonable to expect that a builder should erect a substantial house with a ten years' lease, as that a yearly tenant upon a farm will exert himself to develope the full productive powers of the soil.

In no county have greater permanent improvements been effected on the soil than in Norfolk, and in that county leases are more common than in many others.

All agreements and clauses in agreements securing to yearly tenants fair compensation for their permanent improvements have virtually the same effect, and are mere modifications of leases.

I shall forbear to occupy more space upon a subject to which a whole essay might well be devoted, and upon which so much has already been well said and written. I must acknowledge still that the question has two sides to it, and is therefore one that I should be sorry to dogmatise upon; and is, moreover, of that delicate nature, that it is difficult perhaps to advance the opinions I entertain on the subject, without clashing with traditionary but doubtless laudable feelings and prejudices that prevail, perhaps to a greater extent in this county than in many others, in favour of the ancient and more feudal state of things.

However, I make no apology for speaking my own convictions on a question of such moment to the landed interest at the present time, and one that must necessarily soon be brought to a practical solution, by carefully weighing the good and evil on both sides the question, and fearlessly adopting that course which will stimulate increased energy amid present difficulties; and, being based on principles of equal justice, will eventually secure the greatest amount of benefit both to the landowner and landholder.

One thing is certain, that an universal feeling is prevalent amongst all the educated and most enlightened tenantry in this county, that greater protection for the expenditure of their capital is required; and the stifled cry from east to west is for some measure of the nature of a "tenant-right" bill.

Removal of hedge-row timber.

Another great improvement to be effected by the landlord is the removal of hedge-row timber, which (particularly that most pernicious of weeds the ash tree) now overruns a considerable portion of the county to a perfectly outrageous extent.

All that district of the county west of a line drawn from Wellingborough to Welford, is the part in which hedge-row timber is most prevalent. The age of the ash timber throughout the district dates from the time of the various inclosures, ranging from 30 to 90 years. The arguments used in favour of its culture may be—first, that the red loamy soil is particularly favourable to bringing it to great growth and perfection; second, that the present low price of timber does not justify the proprietor in felling it; and, lastly, that upon grass lands it is not injurious to the farmer.

True the red soil does bring the ash to great perfection, and it is equally true that all manner of corn, roots, and vegetables that the wants of man require will also grow upon it in the greatest abundance, while it produces the best sample of wheat and barley in the kingdom; but timber and corn will not flourish together, as is but too clearly demonstrated by the large round bare patches in the turnips and barley beneath the branches of the trees, looking as if some deadly poison had distilled from their leaves. The matter, therefore, resolves itself into this simple question, In which state of cultivation will the land yield most profit, as a wood or as a garden? It is equally prolific in both capacities, but when a combination of the two is attempted, the tree takes more than the lion's share of the spoil.

True also it is that the price of timber is excessively low, but a variety of causes will not only keep it so, but in all probability send it even lower. The low duty on imported timber, the reduced price of coal, and the extensive use of iron in agricultural and other implements, all tend to depress the price of home-grown timber, so that the small value is only an additional argument against the culture of it in the hedge-rows being continued. In many parishes the ash is very abundant where the soil is by no means congenial to its growth, and trees planted seventy-five years ago will only fetch 4*s.* 6*d.* each at the present time, not quite $\frac{3}{4}$*d.* a year for the time that they have been growing; at the same time each tree is probably doing 2*s.* worth of damage to the crops every year, whilst the roots run so close to the surface of the ground that the iron ploughs are frequently broken by them.

The last assertion, that hedge-row timber does no injury to grass land, is also quite a mistaken one, apparent to all who look at all closely into the matter. The grass deprived of sun, air, and nutriment is thin, coarse, and mossy, and not so sweet and palatable to the cattle as that which grows in the open parts of a pasture field; again, the dead leaves falling in the autumn cover up the grass and render it unpalatable to the cattle just at the season when every blade is required, which quite negatives any advantage that the dead leaves might eventually confer in the shape of manure.

The greater portion of the road from Northampton to Towcester is thickly lined with ash on both sides the way standing at distances of from four to six yards apart; the parish of Wilton is overrun with the same tree, which completely surrounds both arable and pasture fields, many of which are very small. I have counted there as many as 50 ash trees of large size, in a space of ten chains round a small arable field. In the parish of Byfield they are equally prevalent, with this peculiarity, that many of the fields are surrounded by a double hedge and ditch, measuring from outside to outside 18 feet, and the trees stand in a row upon the space of ground between the hedges, and this frequently forms the inclosure to an arable field of as good land as any in the county. Mr. Barnes, a farmer in this parish, has lately added one acre to a ten-acre field, by grubbing the superfluous width of hedge-row, having obtained permission to do so from his landlord. Fifty more names might be mentioned where the order of things is much the same. Again, the beauty of the county is considerably impaired in many parts by the superabundance of timber, and resembles a confused wood or forest; for I think no one can see much beauty in small fields completely surrounded by trees at almost regular intervals; about one-fifth the quantity of timber left here and there in small clusters or alone, would, I think all must agree, look much more picturesque.

TENANTS' IMPROVEMENTS.

Light-land improvements.

Claying recommended.

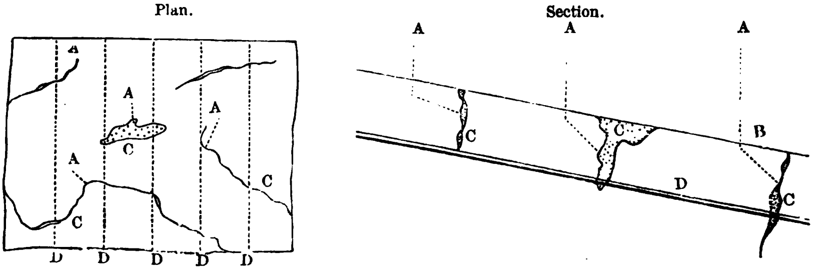
The principal amount of agricultural talent being concentrated upon the fine turnip-growing soils, I have no improvement to suggest to those systems of cropping which I have selected as being amongst the best conducted. Having only strongly to recommend a much more extended use of clay upon the red soils, which are frequently of two friable a nature, burning up in dry seasons, and consuming the manure in an incredibly short space of time Many fields near Northampton, which yield six quarters of wheat to the acre in a moist season, frequently produce no more than three after a dry, hot summer. It would be difficult to find clay upon some farms, I own, but if results could be secured as favourable as those previously mentioned as being attained by Mr. Gaudern (and this could first be proved by experiment) it would well answer to cart clay a considerable distance, say even a mile, if it could be procured, being, next to thorough draining, one of the most lasting improvements that can be effected. In conclusion, I can only add that with such men as Mr. Webster and Mr. Jones at the opposite extremities of the county, and Mr. Gaudern in the centre, those who should seek a hint on the subject of light-land farming need not travel further for the purpose than to the farms of one of those gentlemen.

Heavy-land Improvements.

Although now farming upon cold, heavy land myself, I do not pretend as yet to be fully acquainted with its capabilities. Hampered in first entering upon it by the want of efficient under-drainage and other causes (which are now however in course of being effectually remedied), I have not had sufficient time to launch out into improvements which the demonstrations of modern science and an acquaintance with practices successfully carried out on such soils in other counties certainly warrant one in attempting. Still I shall take upon myself to make a few remarks on those points in which I consider that our heavy-land farming is behind that of some other counties. In the first place we are encumbered with those high-backed "rainbow ridges" (as they are called, from the curved form in which they traverse the fields). A great deal has been said about the policy of laying them perfectly flat, and I think that they might decidedly be made so, in all cases where the fields have a tolerable natural inclination towards one side or another; and this is my theory on the subject.

Discussion as to whether ridges can be dispensed with.

In the first place, it is always the case that no clay, however dense and compact its nature, extends far in any field without a break or fault of some kind, either in the shape of some minute joint in the clay, a small bed of loam, or gravel, or perhaps a thin vein of black mould; all these, however minute, allow water to pass freely through them. Supposing, then, a drop of rain, A (on the annexed plan and section) to fall upon the inclined surface of a field B, and passing freely through the p staple to come in contact with a refractory and dense mass



of clay, it would, following the natural inclination of the field towards B, quickly find its way through the fissure or fault C, into the drain D; and, when it is remembered how small an inclination is required for the conveyance of water, any artificial ridges for that purpose on the surface of an already sloping ground must be indeed superfluous.

Where strong clay land, however, lies on a dead level, I have my doubts as to the advantage of entirely doing away with the old-fashioned round ridges (although, doubtless, they may always be considerably reduced), a case having lately come under my notice in which the complete levelling of them has been an apparent failure. This is upon a farm the property of Earl Fitzwilliam at Old Weston, in Huntingdonshire, immediately adjoining to the parish of Clapton, in this county. The land is of thin staple, upon a subsoil of strong clay intermixed with chalk stones and flints. At the time of the inclosure of the parish, which took place ten years since, this farm was completely tile-drained to the depth of three feet, and the high-backed ridges entirely levelled. The result is that upon those fields which have little natural fall the drainage is anything but efficient, and the land is not nearly so dry and firm to the foot after rain as adjacent lands which still lie upon the ridge. The drains were laid up the ancient furrows, which averaged about eight yards wide, and for the most part lie in an opposite direction to the present straight ones, consequently the drains run transversely with the present furrows; and walking up them I noticed that where the drains crossed the land was driest, and the point which was formerly a ridge was wettest, so that up the new furrows the land is alternately wet and dry, there being no natural inclination to equalize the whole and convey the water either to the vicinity of a drain or to some natural joint or break in the clay. This clearly shows (unless, perchance, there was some great fault in the method of carrying out the drainage, which is always a nice matter, and requires a little engineering upon level ground), that on an impervious subsoil, where no ridges exist, and there is no natural fall on the land, drains require to be much closer together, which fact was so apparent that upon one field of this farm a drain was subsequently laid between each of the former ones, of course doubling the expense previously incurred, so that the drains upon that portion are three feet deep and little more than five yards apart (some of the old ridges being 10 to 12 yards wide) involving an outlay that the natural poorness of the land scarcely justifies.

Difficulty of reducing ancient ridges.

Another serious difficulty presents itself in carrying out the reduction of ridges, which is the loss of staple upon the crowns of the lands, and the exposure of the clay subsoil. To obviate this, upon the farm above described, regardless of expense, the surface-soil of the ridges was in the first place stripped off and laid on one side, and then a couple of "spitches" of clay were removed, and the soil previously reserved laid upon the ridge, which cannot have been effected at a cost of much less than 4*l.* per acre. Notwithstanding, the land has as yet by no means recovered from the effects of the alteration, although carried out ten years ago, for when the land is in crop such is the difference in the length and quantity of corn, that, viewed from a short distance, it gives the appearance of land still upon high ridges, the usual order of things, however, being reversed, *i.e.* the corn is strong and good over the site of the old furrows, and the straw short and weak, and the ears small on the part formerly occupied by ridges. Perhaps the reader may say, that the good corn which marks out the position of the old furrows is occasioned by the drains, which also run in the same direction; but this is not the case, for, as I mentioned before, one field has been drained both along the ridge and furrow, and still the difference is quite as marked, and therefore is entirely due to the want of staple and the proximity to the cold, hard, white clay.

Best practical method.

Experience has shown that the only practical way is to work the ridges gradually down with the plough, either by "throwing" twice to once "ridging up," or to plough with a deep furrow when throwing, and a thin furrow when ridging up, and when manuring to bestow the dung most liberally upon the ridge to compensate for the loss of mould, or a thin sprinkling of guano has been applied, in such a case, with good effect. After all, however, this is an improvement the benefit of which seems so remote (it even occasions a loss during the time of its being carried out), that few tenants make much progress at it, and it is only on farms occupied by the proprietor that this improvement has generally been thoroughly effected upon heavy lands in this county. Where the land has been thus levelled, it is laid out in straight furrows at regular widths and parallel to the sides of the fields, which gives a farm a more neat and workmanlike appearance. But I think that we ought to go a step further in the management of our heavy lands, by ploughing them into the narrow "stetches," eight feet two inches in width, as is the universal practise upon the strong lands of Suffolk, which county may justly be called the heavy-land Garden of England. The drills, harrows, and rollers, are there all constructed to fit the gauge of the furrow, and the shafts so arranged that a horse walks up each furrow without treading upon and poaching the new-sown land; the rollers are also furnished with a joint in the middle, to accommodate themselves to the slight curvature of the stetch. This practice is general in Essex as well as Suffolk, both which counties are deservedly famed for the excellence of their farming, and the great regularity and neatness of the drilled corn; and I can speak of the former county from considerable personal acquaintance with it some years back, during the four years that I resided as a pupil with Mr. Robert Baker of Writtle. Stetches.

A Northamptonshire farmer, on the above system being proposed, will exclaim, "You will be all furrows, and lose no end of land;" but by arranging the coulters of the drill so that the outside row of corn falls close to the edge of the furrow very few inches will be lost, and this I am confident will be more than compensated for by the preservation of the strong land from the poaching of the horses. Mr. Parsons, who occupies about 700 acres of land in the parish of Great Weldon, has ploughed down the whole of the high ridges upon his farm, many of which used formerly to run diagonally to the inclosures, making the land inconvenient and expensive to plough, from the multiplicity of turnings for the horses and short lengths to plough. He fully agrees with me in the advantage of the Essex system of eight feet stetches to suit the drills and harrows, and says that it is his immediate intention to adopt it.

One horse carts recommended.

Great improvement is needed in the general construction of carts in this county, which, with their huge wooden axles and unwieldy size, seem better constituted for drawing by main force through the mire of the last century, than upon the improved highways of the present day.

I go so far as to object to two-horse carts *in toto*, and can fully vouch, from experience, for the perfect efficiency and greater economy of a lighter vehicle drawn by one horse.

Let us make a comparison of the work that can be done by the two different systems. A fair load for a one-horse cart is 20 cwt. mine never take less, and this can be drawn up any ordinary hill, so that three horses will remove three tons; 30 cwt. is the full load usually put upon our ordinary two-horse carts, so that it will require four horses and two carts to remove the same weight of three tons; and the saving of one horse in a team of four is a consideration in these days of small profits.* Again, taking the weight of a one-horse cart at 8½ cwt., and the weight of a two-horse cart at 15 cwt., we have in returning empty in the latter case 30 cwt. very unequally distributed over four horses, inasmuch as from the carelessness of drivers and other causes the greater part of the load of an empty cart is sustained by the shaft horse. True, on the other hand we have 25½ cwt., but it is equally divided over the whole three horses, no one being able to shirk his work or suffer from the laziness of another. Experience shows that one horse will take his ton as, or more, easily than two will draw 30 cwt.; and it is easily accounted for, it being calculated that a trace-horse cannot exert much more than one-half of his full working effect, from the fact that the line of traction is horizontal and passes above his centre of gravity instead of through it, so that instead of drawing a ton he moves about 12 cwt. only, and two cwt. more may certainly be deducted for the irregularities in the draft of two horses, which frequently from inattention in the driver or their own perverseness do not draw simultaneously.

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* I have had frequent opportunities of judging of the comparative weights of one and two-horse loads in carting coals or goods to and from a railway station where there is an accurate weighing apparatus.

The expense of drivers for three one-horse carts will be if anything less than for two two-horse carts, as one driver easily manages two carts by attaching the halter of the hinder horse to the tail of the first cart; in Scotland one man usually takes charge of three carts.

The difference in cost between three carts and two may be urged in favour of the latter. The difference between three carts at 10*l.* each and two at 13*l.* is but 4*l.*, which is a sum too insignificant to mention when compared with the cost and keep of an extra horse.*

To talk in a popular way and make my meaning clearer, a horse when in the shafts not only draws but he carries also, and when drawing a load of 20 cwt. upon level ground, 130 pounds weight on an average lies directly upon the horse's back, and consequently reduces the weight that he has to draw to that extent; and having this weight to carry, instead of deteriorating his powers of traction, increases them to an extraordinary degree. In illustration of this, I have seen a bet laid and won by the smallest man in a company that he will take the heaviest man in the room upon his shoulders and lead the strongest man out by the hand, each party having recourse to nothing but fair drawing; and thus we often see when a heavy load has to be moved, that the thill-horse stands firm upon his legs while the trace-horses are slipping about in all directions, in fruitless endeavours to get a purchase for their feet. The London draymen are fully awake to this fact, when they place

* I may here observe that this Essay was written before I had an opportunity of reading Mr. Pusey's paper on the "Progress of Agricultural Knowledge during the last Eight Years,"[a] or I should not perhaps have enlarged so much on the advantages of one-horse carts after the able manner in which he has handled the subject, but, as my investigations have been principally directed to the comparative merits of one over two-horse carts, whilst he has more particularly shown the superiority of one-horse carts over waggons, my observations may not be altogether uninteresting or superfluous.

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[a] Journal of the Royal Agricultural Society.

boys upon the horse's shoulders in ascending the steep passages from the River Thames or elsewhere. And the driver of a locomotive has at his command an apparatus by which he can throw nearly the entire weight of the engine upon the driving wheels, and this he has recourse to in ascending heavy inclines for the purpose of making the wheels bite the rails. And I firmly believe that in a two-horse load of 35 cwt. in giving credit to the leader for moving 12 cwt. of it, I have overstated his merits.

I am not much more favourably inclined towards wagons than two-horse carts, unless they are provided with double shafts for the horses to draw abreast, the loss of power being so excessive in three or four horses drawing at full length.

PLOUGHING.

Although our prevailing practice upon the heavy soils, of ploughing with four horses at length, moving scarcely at the rate of two miles per hour, and turning over about three roods per day, is very objectionable, I am not prepared by personal experience (for reasons above stated) to show the exact reduction of the power now expended in ploughing, that the nature of the soil will allow of being made. I have seen the Roothings of Essex and heavy-lands of Suffolk—land apparently as strong as ours, where a pair of horses abreast turn over their acre per day; but possibly if a close comparison of the soils were made, the Suffolk and Essex land might be found to contain an amount of grit and sand which ours has not, and which is so essential in scouring the plough, and facilitating its passage through the soil. Though prepared to show by calculation (taking into account the reduction in weight of harness, &c.) that three horses, two abreast and one in front, unicorn-fashion, all drawing directly from the plough, would be almost if not quite as effective as four horses at length, I shall refrain from doing so until I can back my theory by practice. I shall be told that great damage will be done to the *whole* ground, which will be "saddened," that is, too much consolidated, by one or two of the horses walking upon it; but I contend that more harm is done by the present system, in which four horses walk in a line up the furrow, treading and compressing the already impervious subsoil, than by two only walking in the furrow, and one upon the land that will immediately afterwards be turned up and lightened by the plough. We seem particularly careful of the land while ploughing it, but think nothing of the treading which it gets in the subsequent drilling and harrowing; being exactly the reverse of the principle which seems to actuate the Suffolk farmer.

To conclude the subject: the improvement in ploughing heavy land that I have to suggest, and shall forthwith put in practice myself, feeling the greatest certainty of success, is, for the first breaking up of "edishes" and clover-leys to use three horses, two to follow one another up the furrow, the third to walk upon the land abreast of the hindermost of the two others, the off-horse to have a cart-saddle, and the leader attached to the chains in the usual way, the larger swingtree to be longer upon one side than the other to equalize the draft of two drawing against one. For all subsequent "stirrings" two horses a-breast will be quite sufficient. Of course there must be a modification of these arrangements in winter or a wet season, and it is also advisable to plough the last few bouts of ridges or furrows with the horses at length, in order that they may not trample the new ploughed ground; for which purpose it is better to leave all the furrows or ridges for the last day's work, that no time may be lost in altering the arrangement of the harness.

Advantage of burning old sward.

Paring and burning the soil is not much carried on in this county, except in the case of breaking up an old pasture, where it is found to be indispensable, for destroying the wire-worm, and reducing to ashes the superfluous vegetable matter and masses of fibres and roots of the coarse grass, which grew upon the ant-hills or "hassocks," as they are called. Of two adjoining fields of old pasture that were broken up by Mr. Robert Wiggins of Orton Lodge, near Kettering, the one was pared and burnt, and the first crop of black oats yielded 10 quarters to the acre; the other was broken up without burning, and produced but three quarters; and the difference was equally marked in the succeeding crop of wheat, the difference of the expense being only 1*l.* per acre in favour of the field not pared and burnt, as it required six horses to plough it up the first time.

Burning clay recommended.

The burning of clay and earth in large heaps is successfully carried on by several farmers in the neighbourhood of Northampton, and used as a dressing for heavy land, for the purpose of rendering it more friable. For this purpose the scouring of the ditches, any spare clay that remains after filling in drains, and any rough grass and soil obtained in trimming up hedgerows or levelling banks, is collected together. If there is not a sufficiency of weeds or other vegetable matter contained in the heap to burn the mass into the requisite red ash, a portion of refuse coal-dust or slag (as it is called), which may be obtained occasionally from the coal merchants at the rate of about 5*s.* per ton, is used; as also the refuse bark from the tan-yards, which not only helps to consume the heap, but also affords when burnt a fine alkali, which is very beneficial to the crops. This bark is frequently given away at the tan-yards to those who choose to fetch it.

To burn a heap, a small fire of wood and coal is first lighted, which is covered over with a layer of clay, over which a few shovels-full of refuse bark or coal-dust are scattered: when the fire begins to burst through, more earth is laid on, and the same process repeated until the whole heap is made up.

Considerable judgment is required on the part of the workman to burn a heap properly; few excel at it, and the art can only be acquired by practice and attention. As soon as the fire has attained a good heat, the heap requires raking down rather flat, to afford a larger hot surface for fresh earth to come on; and in windy weather care must be taken to apply the fresh material on the contrary side to that on which the wind lies, or one side will burn out before the fire touches the other.

Mr. Collins of Monk's Park, near Northampton, was I believe the first to introduce this practice, and he speaks most highly of the beneficial effect of burnt clay to the land. He selected the worst and most neglected field upon his property to operate upon first. The soil was cold and stiff, and had the character of never having been free from weeds. His first step was to drain it thoroughly and deeply, and then apply a dressing of

30 or 40 cubic yards of burnt earth to the acre; and he states that by the three first crops after the application, consisting of one of potatoes and two of wheat (happening in dear times) he realized the fee-simple value of the land; and he considers that the whole of his land ploughs one horse easier, now that it has all been dressed with ashes.

Mr. Collins has made no calculation of the exact cost of obtaining a cubic yard of these ashes; but, judging from the quantity of coal required for burning clay into ballast or for road-metal, I should consider that three cwt. of coal would be amply sufficient to burn a cubic yard of clay to a red ash, thus:

	s.	*d.*	
3 cwt. coal at 3*d.*	0	9	
Getting and burning . . .	0	6	
	1	3	per cubic yard.

The principal secret in burning strong clay is to throw it wet upon the burning clamp; the lumps then come out in a cracked state, and presently moulder down with the weather: if, on the contrary, it is laid on in dry, hard lumps, it will inevitably burn into brick, and lie "knocking about" the land perhaps for two or three years before the frost will crumble it down. Common bricks are a proof of this, for, if burnt before being thoroughly dried, they will certainly turn out unsound and incapable of standing the weather.

The advantage of this system is, that most of the benefit of paring and burning is obtained, without reducing the staple of the land, by consuming by fire the vegetable matter contained in it.

And those who farm within an easy distance of a tan-yard or coal-wharf, would do well to avail themselves of the facility thus afforded for obtaining a cheap fuel suited for the purpose.

WEEDS.

Amongst the noxious weeds most prevalent, and often too leniently dealt with, may be mentioned,—

Sinapis arvensis.	Charlock.
Agropyrum repens.	Twitch, quitch, or couch-grass.
Anthemis cotula.	Mayweed.
Ranunculus arvensis.	Horse-gold.
Papaver rhœas.	Corn-poppy.

Eradication of charlock.

The charlock, although but an annual, puts the farmer's patience and perseverence to a severe test before it can be thoroughly exterminated. The durability of the seed in the ground is extraordinary; the oil contained in it being considered to conduce principally to its preservation. Pastures have been broken up which had not been ploughed before in the memory of man, and become immediately a mass of charlock; and, by a close inspection of the soil, the seeds may even be detected amongst it.

It is most abundant upon the strong chalky clay and marly lands, and little progress has hitherto been made in the thorough eradication of it. It sometimes disappears for several seasons, and the farmer begins to congratulate himself, as he thinks, on having got the better of it, when an extra-deep ploughing will fetch up and cause to germinate, by exposure to the air, seeds that have lain dormant for years; and it is only by constant hoeing and hand-weeding for six or seven years that it can be perfectly subdued: and the first hand-weeding will sometimes cost as much as 15*s.* per acre. It somehow happens that many farmers have not that rooted antipathy to charlock that they ought to have. I believe that the fact of its appearing so much more abundantly in some seasons than others favours the belief amongst them that the plant is a mystery, and produced by causes beyond their control—an absurd notion, and, it is needless to say, scouted by all intelligent men.

Want of perfect under-draining, and the practice of ploughing with too shallow a furrow, are great causes of the prevalence of twitch.

Frequently have I gone into fields of naked fallow that have been repeatedly ploughed during the summer, and the twitch picked out at great expense, and have found by digging the next two or three inches below the depth ploughed, abundance of twitch, which of course, when the land is in crop, soon usurps again the dominion of the soil; and, moreover, possibly spreads the quicker from having been cut into pieces by the plough.

Other weeds are too well known to require comment; constant application of the hoe, followed by children to hand-weed the rows, being generally the best system of extermination.

Spirit of improvement abroad, but knowledge and the means of knowledge deficient.

In conclusion, I cannot but remark with pleasure upon the spirit for agricultural improvement which seems to pervade by far the greater part of our farmers, and the energy with which they vie with one another, by increased cultivation, to rouse up the latent energies of the soil. But at the same time I cannot forbear from expressing a conviction (and I trust that I shall be pardoned for speaking candidly) that the farmers, as a body, are deficient in that moderate amount of mechanical and scientific knowledge requisite for the economical distribution of power, whether horse or other, and also to enable them to apply successfully such (and such only) of the improvements, which the discoveries of modern science have brought to light, as are suited to the peculiarities of soil, climate, and locality of their own farms.

I cannot hold up our neighbours beyond the Tweed as exclusive patterns in agriculture, on account of that almost national slovenliness, so offensive to the senses of us squeamish southrons, which extends in some measure to their farming establishments; but, during a five years' residence in Scotland, I could not but be forcibly impressed with the advantages which universal education gives the Scotch over us in many important particulars; and the practical application of that learning has enabled them, not only to be foremost in adopting new discoveries, but to introduce many economical usages into farming, which are by no means common in England.

And while on the subject of education, too much cannot be said in commendation of those agricultural schools which, with the routine of a sound commercial education as a foundation, impart also the principles of agricultural chemistry and the elements of mathematics and mechanics. One of these schools has, within the last few years, been established, under the auspices of his Grace the Duke of Manchester and Lord St. John, at Kimbolton in Huntingdonshire, upon the borders of this county. There, or at similar institutions, the farmer's son may obtain that theoretical knowledge which bears upon the science of agriculture in particular; which, in addition to that more essential part—the practical knowledge—(which no one is better qualified to impart to him than his own father at home) will enable him to maintain his position against the aggressions of that busy set of manufacturers who, having accumulated wealth in trade, are so anxious, and spare no expense, to get possession of the soil, to the exclusion of the hereditary and, we may almost say, rightful occupier.

Hargrave, February, 1851.

J. B. Nichols and Son, Printers, 25, Parliament Street, Westminster.

GUTTA PERCHA TUBING

FOR

WATERING GARDENS, &c.

The Gutta Percha Company have been favoured with the receipt of the following

TESTIMONIAL

FROM MR. J. FARRAH, GARDENER TO BOSWELL MIDDLETON JALLAND, ESQ. OF HOLDERNESS HOUSE, NEAR HULL.

I have had 400 feet of your Gutta Percha Tubing (in lengths of 100 feet each, with Union Joint,) *in use for the last twelve months for watering these gardens, and I find it to answer better than anything I have ever yet tried.*

The pressure of the water is very considerable, but this has not the slightest effect on the Tubing.

I consider this Tubing to be a *most valuable invention for Gardeners*, inasmuch as it enables us to water our gardens in about one-half the time, and with one-half the labour formerly required.

GUTTA PERCHA TUBING

FOR

SPREADING LIQUID MANURE.

FROM JAMES KENNEDY, ESQ., MYREMILL, BY MAYBOLE, AYRSHIRE.

May 20th, 1850.

I have received your inquiry as to my experience in the use of Gutta Percha Tubing. I had 350 yards of it from your firm, and I have used it for the last few months in distributing liquid manure from my tanks over my fields, having often a pressure of 300 feet on it, and have been able to get the liquid from the end of the Tubing by the pressure from the steam engine, upwards of forty yards. I have 350 Scotch acres laid with metal pipes under ground, for the conveyance of liquid manures over my farm, and your Gutta Percha Tubing has given me great facility in spreading it over the surface of the land.

I likewise think highly of the Gutta Percha Union Joint.

⁂ Tubing of any required length up to six inches in diameter, with Jets, Union Joints, Roses, Spreaders, &c. manufactured at the Company's Works, Wharf Road, City Road, London, and sold by their wholesale Dealers in Town and Country.

THE GUTTA PERCHA COMPANY, PATENTEES,

18, WHARF ROAD, CITY ROAD, LONDON.

DURABILITY
OF
GUTTA PERCHA TUBING.

Many inquiries having been made as to the Durability of Gutta Percha Tubing, the Gutta Percha Company have pleasure in giving publicity to the following Letters from parties who have had it in use for a considerable length of time.

From SIR RAYMOND JARVIS, Bart.
VENTNOR, ISLE OF WIGHT.

SECOND TESTIMONIAL.

March 10*th*, 1852.

In reply to your letter received this morning, respecting the Gutta Percha Tubing for Pump Service, I can state with much satisfaction, it answers perfectly. Many Builders, and other persons, have lately examined it, and there is not the least apparent difference since the first laying down, *now several years;* and I am informed that it is to be adopted generally in the houses that are being erected here.

From C. HACKER, Esq. Surveyor to
HIS GRACE THE DUKE OF BEDFORD,
WOBURN PARK.

SECOND TESTIMONIAL.

Office of Works, Woburn Park,
January 10*th*, 1852.

GENTLEMEN,

In answer to your inquiries respecting the Gutta Percha Tubing for Pump Suctions, I find that the water has not affected it in the least, *although it will eat lead through in two years.* We have adopted it largely, on account of its being cheaper than lead, much easier fixed, and a more perfect job.

Every variety of Gutta Percha Articles, such as Soles for Boots and Shoes, Mill Bands, Picture Frames, Brackets, Mouldings, Pen Trays, Inkstands, Medallions, Surgical Instruments, Vases, Trays, Watch Stands, Cups, Flasks, Lathe Bands, Clothes Lines, Cricket and Bouncing Balls, Pump Buckets, Chamber Bowls, Washing Basins, Tubing for Gas, Water, and Speaking Pipes, Sheets for lining Tanks, &c. Cash Bowls, Ornamental Flower Pots, Soap Dishes, &c. manufactured at the Company's Works, Wharf Road, City Road, London, and sold by their Wholesale Dealers in Town or Country.

THE GUTTA PERCHA COMPANY, PATENTEES,
18, WHARF ROAD, CITY ROAD, LONDON.

W. BALL,

PLOUGHWRIGHT, AGRICULTURAL IMPLEMENT
MAKER, IRON AND BRASS FOUNDER,

ROTHWELL, NORTHAMPTONSHIRE,

calls the attention of the Agriculturists to his

CRITERION PRIZE PLOUGH,

which the prize was awarded to for general purposes, at the Royal Agricultural Meetings held at Norwich, 1849, and at Exeter, 1850: also a Prize Medal at the Great Exhibition of All Nations, 1851.

He now offers it to the Public on the following terms:—

	£	s.	d.
The Criterion Prize Plough, with steel furrow-turner .	4	4	0
Do. do. with cast furrow-turner .	3	15	0
The Superior Swing Plough	3	3	0
Skim Coulter	0	6	6

Drills, Thrashing, and Winnowing Machines, Carts, Waggons, and other implements, manufactured of the very best materials, and of superior workmanship, on the most approved principles, at prices which cannot fail to give universal satisfaction.

PRIZE PORTABLE STEAM ENGINES, GRINDING MILLS, AND THRASHING MACHINES,

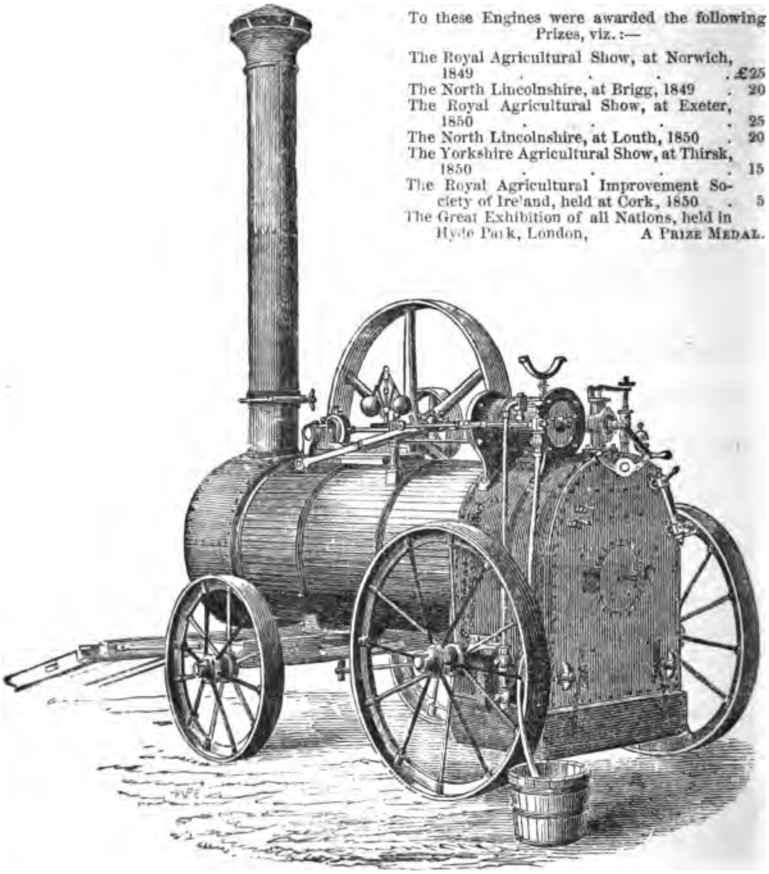
MANUFACTURED BY

CLAYTON, SHUTTLEWORTH, AND CO.,

STAMP END IRON WORKS, LINCOLN,

AND

7, NEW ROAD, FITZROY SQUARE, LONDON.



To these Engines were awarded the following Prizes, viz.:—

The Royal Agricultural Show, at Norwich, 1849	£25
The North Lincolnshire, at Brigg, 1849	20
The Royal Agricultural Show, at Exeter, 1850	25
The North Lincolnshire, at Louth, 1850	20
The Yorkshire Agricultural Show, at Thirsk, 1850	15
The Royal Agricultural Improvement Society of Ireland, held at Cork, 1850	5
The Great Exhibition of all Nations, held in Hyde Park, London,	A PRIZE MEDAL.

THESE Engines, on most occasions, were brought into competition with Makers from all parts of England; yet, notwithstanding, they have succeeded in carrying off the above PRIZES, a position C., S., and Co., feel proud to occupy, and are determined to maintain.

The great saving effected in agricultural operations by the use of Portable Steam Engines may no longer be considered a theoretical question, but is admitted by all employed or interested in agricultural pursuits to be the most efficient and economical, consequently the most desirable, mechanical power the farmer can possess.

C., S., and Co., also beg to call the attention of agriculturists to the extreme simplicity of their Portable Engines—one of the most desirable features for a farm engine to possess. Their general arrangement is such as will admit of the vital parts of the Engine being looked at without having the whole Machine taken to pieces.

The fact of Steam being the most efficient and economical agent, and that these Engines are well adapted for the purpose, is fully borne out by testimonials and letters which C., S., and Co., can show from parties whom they have supplied with Engines as early as 1845. They are fitted with an improved governor, and are so very easy and simple to work that a farm labourer may be taught in the course of a few days all that is necessary for their future management. As a proof of their general use, immediately around Lincoln upwards of 80 farmers in one office alone (the County Fire Office) have clauses inserted in their policies permitting the free use of these Engines on their several farms. When applied to C., S., and Co.'s improved Combined Machines, they will thrash out clean, and in a most satisfactory manner, as follows:—

Nine-horse power, from 80 to 90 qrs. of mown wheat per day of 10 hours—consumption of coals, 8 cwt.

Seven-horse power, from 55 to 60 qrs.—consumption of coals, 7 cwt.

Six-horse power, from 45 to 50 qrs.—consumption of coals, 6 cwt.

Five-horse power, from 35 to 40 qrs.—consumption of coals, 5 cwt.

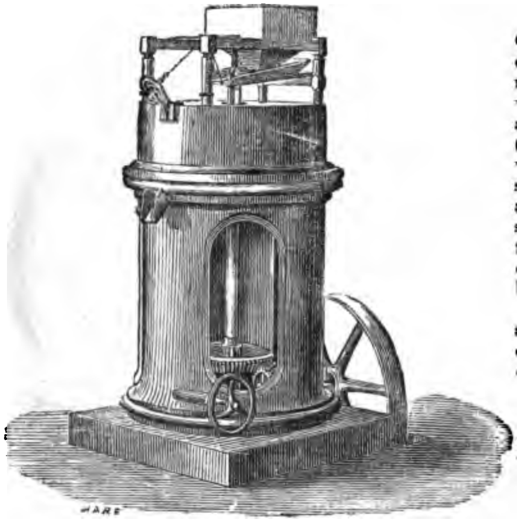
Four-horse power, from 25 to 30 qrs.—consumption of coals, 4 cwt.

Three-horse power, from 20 to 25 qrs.—consumption of coals, 3 cwt.

Engines, of Three, Four, Five, Six, Seven, and Nine-horse Power are now being made at the above Works, where, on application either personally or by letter, every information as to management, cost, &c. will be gladly furnished.

Three-horse Power, with Governor, felted and cased complete	£135	0	0
Four-horse Power, ,, ,, ,, ,,	155	0	0
Five-horse Power, ,, ,, ,, ,,	175	0	0
Six-horse Power, ,, ,, ,, ,,	195	0	0
Seven-horse Power, ,, ,, ,, ,,	215	0	0
Nine-horse Power, with Double Cylinder ,, ,,	255	0	0

REGISTERED PRIZE PORTABLE GRINDING MILL.



Adapted for Crushing and Grinding Agricultural Produce. They will Grind to fine meal 6 bushels per hour. The whole being constructed upon a cast-iron cylindrical frame (cast in one piece), renders it very substantial, extremely simple, and easy to fix. Many attempts have been made to supersede the use of Stones for crushing Agricultural produce, but as yet nothing has been invented to equal them.

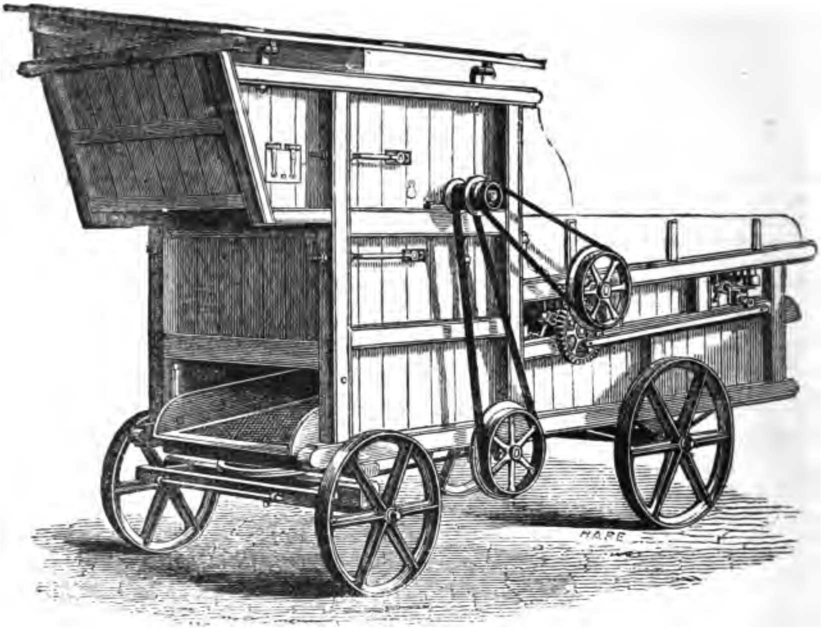
The prize of £10 was awarded to this Mill at each of the Royal Agricultural Society's Meetings held at Norwich in 1849 and at Exeter, 1850.

With respect to its performance and general adaptation to agricultural purposes, when brought into competition with thirty-two other mills exhibited and tested at the Royal Agricultural Meeting held at Norwich in 1849, the Judges in their report make the following observations:—"The portable mills for grinding fine meal did not possess much merit, with the exception of Messrs. Clayton and Shuttleworth's, to which we awarded the prize. It both kibbled and ground in superior style to any of the others, grinding barley perfectly well at the rate of 6 bushels per hour without much heating the meal. It was upon the same principle as fixed mill stones usually are, as well got up in point of workmanship, and took little room, so that we considered it a valuable implement."

Price.

With Derbyshire Stones	£45	0	0
With French Burr Stones	50	0	0

REGISTERED PRIZE COMBINED THRASHING, STRAW-SHAKING, RIDDLING, AND WINNOWING MACHINE.



The chief novelty in this Machine is the very simple and efficient combination of Thrashing, Shaking, Riddling, and Blowing at one operation, which is performed in the most effectual manner. It is a well-known fact amongst practical agriculturists that the Dressing of the Grain from a common Thrashing and Shaking Machine has been quite as costly as the first operation, and in some cases more so.

This difficulty is entirely obviated by C., S., and Co's Vibrating Trough, which is suspended by four links, and extends the whole length of the Machine and Straw Shaker: a reciprocating motion is imparted by a crank, and by means of this Vibrating Trough the whole, as it drops from the Thrashing Drum and Straw Shaker, is collected and then passed over a riddle, under which the blast from the blower is directed, thereby effectually separating the Corn, Chaff, and Pulse from each other, each being discharged into the place assigned for it—thus effecting a saving in manual labour of fully one-third over the old mode of thrashing, a saving too beneficial to be passed over unnoticed.

This Machine was exhibited at the North Lincolnshire Show, held at Caistor, in July, 1851, and was awarded the Prize of £5. The same Machine was awarded the Prize of £10 at the Yorkshire Show, held at Bridlington, in the same year. At this Show the Machine was brought into competition with Machines from the best Manufacturers: the experiments were superintended by Mr. Amos, Engineer to the Royal Agricultural Society of England, who expressed himself highly pleased with its efficient performance, and its general arrangements, which he admitted were very simple.

Prices.

	Three-horse.	Four-horse.	Five-horse.	Six-horse.	Seven-horse.
With Wood Wheels	£55	£60	£65	£70	£75
With Iron Wheels	50	55	60	65	70
Without Wheels	45	50	55	60	65

If this Machine be adapted to both Bolting and Thrashing (a plan C., S., and Co. recommend) £5 extra.

C., S., and Co. also beg to call the attention of Landed Proprietors and Agriculturists to their very improved and efficient fixed BARN WORKS, by which the Grain is Thrashed, Shaken, Dressed, put into the sacks, and weighed, all ready for market, at one operation. Their experience in this class of Farm Engineering has been very great; and they flatter themselves they can put up the most efficient and simple apparatus for the purpose, as all Farm Buildings involve a different arrangement. On application, C., S., and Co. would be glad to visit the place, if required, and to furnish Plans and Estimates for the whole. They are also prepared to guarantee their efficiency.

RANSOMES AND Co.,

IRONFOUNDERS, ENGINEERS, AGRICULTURAL IMPLEMENT MAKERS, &c.

IPSWICH,

Manufacturers of Patent Iron and Wood Ploughs in great variety, to suit every description of soil. Broad Share Ploughs,

BIDDELL'S PATENT SCARIFIERS,

Cultivators, Norwegian and other Harrows,

CROSSKILL'S CLOD CRUSHERS,

Field Rollers, Corn Rick Stands, Portable and Fixed Steam Engines, Thrashing Machines (portable and fixed) with all the recent improvements, Straw Shakers, Dressing Machines, Patent and other Chaff Cutters, Grinding Mills of various descriptions, Turnip Cutters (single and double action), Oil Cake Breakers, Horse Powers, Scotch and other Carts,

HUSSEY'S IMPROVED REAPING MACHINES,

&c. &c.

An Illustratfd Catalogue may be had on application by Letter, inclosing Six Postage Stamps to cover the Postage.

PERUVIAN GUANO, NITRATE OF SODA, RAPE CAKES, &c.

THOMAS ELGOOD AND SON, General Merchants, beg to inform the Public that they sell Gibbs' Peruvian Guano, Nitrate of Soda, Linseed Cakes, Rape Cakes, &c. at their Warehouses at St. Neots and Huntingdon, also at the New Wharf, Bedford.

⁂ Agents for Lawes' Patent Superphosphate of Lime for Turnips, Mangold, Carrots, &c., which can be supplied to the purchaser direct from the Patentee by any Line of Railway, or from the Warehouses named above.

May, 1852.

JOHN LAKE BAKER,

SURVEYOR AND ENGINEER,

HARGRAVE, NEAR KIMBOLTON,

begs to inform his Friends, Landed Proprietors, and others, that, in addition to the business of a Surveyor, he prepares Drawings and Estimates for, and Superintends the Erection, Repair, or Rebuilding of Farm Premises, on the most approved arrangements. He also conducts the thorough Drainage of Estates, from accurate levels, and on the most approved and economical principles. Farm Engineering in general. Also the erection of Tile and Brick Works, and inspection of Clay for the same.